NOTICE

All drawings located at the end of the document.

KAISER•HILL
COMPANY

Data Summary Report
IHSS Group 400-10

June 2003

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Data Summary Report
IHSS Group 400-10

June 2003

2

Data Summary Report
IHSS Group 900-4&5

Approval received from the Colorado Department of Public Health and Environment.

( )

Approval letter contained in the Administrative Record.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

4

ACRONYMS AND ABBREVIATIONS

AL	action level
AR	Administrative Record
CD	compact disk
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
DOE	U.S. Department of Energy
DQA	Data Quality Assessment
DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
K-H	Kaiser-Hill Company L.L.C.
LCS	laboratory control sample
mg/kg	milligram per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
ND	not detected
NFAA	No Further Accelerated Action
PAC	Potential Area of Concern
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
pCi/g	picocurie per gram
POC	Point of Compliance
QA	quality assurance
QC	quality control
REC	percent recovered
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RIN	report identification number
RPD	relative percent difference
SAP	Sampling Analysis Plan
SD	standard deviation
SVOC	semi-volatile organic compound
SWD	Soil Water Database
µg/kg	microgram per kilogram
V&V	verification and validation
VOC	volatile organic compound
WRW	Wildlife Refuge Worker

5

1.0 INTRODUCTION

This data summary report summarizes characterization activities conducted at Individual Hazardous Substance Site (IHSS) Group 400-10 at the Rocky Flats Environmental Technology Site (RFETS or Site) in Golden, Colorado. Characterization activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001a) and IASAP Addendum #IA-02-01 (DOE 2001b).

IHSS Group 400-10 consists of the following Potential Area of Concern (PAC) and IHSSs:

- PAC 400-807 – Sandblasting Area;
- IHSS 120.2 – Fiberglass Area West of Building 664; and
- IHSS 600-161 – Radioactive Site West of Building.

The location of IHSS Group 400-10 is shown on Figure 1 and the PAC and IHSSs are shown on Figure 2.

2.0 SITE CHARACTERIZATION

IHSS Group 400-10 consists of historical knowledge (DOE 1992, DOE 2001a) and 48 sampling locations with specifications as described in IASAP Addendum #IA-02-01 (DOE 2001b). The sampling specifications for the characterization samples collected are listed in Table 1. The location of these samples and analytical results are shown on Figures 3 and 4. Analytical results greater than background mean plus two standard deviations or method detection limits are presented in Table 2. Summary statistics are presented in Tables 3 through 6. Deviations from planned sampling specifications are presented in Table 7. A summary of validated analytical records is presented in Table 8 and exceptions to the data validation are presented in Table 9. Raw data are presented in Appendix A. No analytical results are above the RFCA Wildlife Refuge Worker (WRW) action levels (ALs). A comparison of the analytical results to the RFCA WRW ALs is presented in Appendix B.

Analytical results indicate that No Further Accelerated Action (NFAA) for IHSS Group 400-10 is warranted for the following reasons:

- All contaminant concentrations are less than WRW ALs.
- All contaminant concentrations are less than Ecological Receptor ALs.
- There is no identified potential to exceed surface water standards at a Point of Compliance POC from this IHSS Group.

Approval of this Data Summary Report constitutes regulatory agency concurrence of this IHSS Group as an NFAA. This information and NFAA determination will be documented in the FY03 Historical Release Report (HRR).

6

Table 1
IHSS Group 400-10–Characterization Sampling Specifications

IHSS Group	IHSS/PAC/UBC Site	Location Code	Easting	Northing	Media	Depth Interval	Analyte	Laboratory Method
400-10	PAC 400-807 – Sandblasting Area	BZ35-A001	2082600.04	748530.03	surface soil	A	Metals Radionuclides SVOCs	6010 Alpha Spec 8270
		BZ35-A002	2082628.70	748549.76	surface soil	A	Metals Radionuclides SVOCs	6010 Alpha Spec 8270
		BZ35-A003	2082633.14	748514.01	surface soil	A	Metals Radionuclides SVOCs	6010 Alpha Spec 8270
		BZ35-A004	2082613.79	748483.81	surface soil	A	Metals Radionuclides SVOCs	6010 Alpha Spec 8270
		BZ35-A005	2082530.53	748477.75	surface soil	A	Metals Radionuclides SVOCs	6010 Alpha Spec 8270
		BZ35-A006	2082539	748524	surface soil	A	Metals Radionuclides SVOCs	6010 Alpha Spec 8270
		BZ35-A007	2082562.79	748544.18	surface soil	A	Metals Radionuclides SVOCs	6010 Alpha Spec 8270
	IHSS 120.2 – Fiberglass Area West of Building 664	BZ35-B008	2082651	748444	subsurface soil	B	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ35-C008	2082651	748444	subsurface soil	C, D, E, F	VOCs	8260
		BZ35-B010	2082642	748372	subsurface soil	B	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ35-B010	2082642	748372	subsurface soil	C, D, E, F	VOCs	8260
		BZ34-B001	2082558.48	748334.14	subsurface soil	B	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-B001	2082558.48	748334.14	subsurface soil	C, D, E, F	VOCs	8260

IHSS Group	IHSS/PAC/UBC Site	Location Code	Easting	Northing	Media	Depth Interval	Analyte	Laboratory Method
		BZ35-B014	2082640	748395	SAMPLE NOT TAKEN			
		BZ35-B014	2082640	748395	SAMPLE NOT TAKEN			
	IHSS 161 – Radioactive Site West of Building 664	BY34-B001	2082524.00	748359.00	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BY34-B002	2082528.00	748323.00	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BY34-B003	2082539.00	748279.00	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BY34-B004	2082536.00	748252.00	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BY34-B005	2082507.00	748232.00	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BY34-B006	2082508.00	748260.00	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BY34-B007	2082496.00	748326.00	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BY34-B008	2082478.00	748223.00	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BY34-B009	SAMPLE NOT TAKEN					
		BY34-B011	2082499	748302	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BY35-B001	2082520	748395	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BY35-B002	2082491	748374	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260

IHSS Group	IHSS/PAC/UBC Site	Location Code	Easting	Northing	Media	Depth Interval	Analyte	Laboratory Method
		BY35-B003	2082487	748410	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-001	2082543	748339	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-B002	2082656	748302	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-B003	2082660	748265	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-B004	2082663	748229	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-B007	2082634	748205	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-B008	2082632	748244	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-B009	2082623	748315	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-B010	2082619	748351	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-B011	2082591	748319	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-012	2082594	748294	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-013	2082598	748259	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260

IHSS Group	IHSS/PAC/UBC Site	Location Code	Easting	Northing	Media	Depth Interval	Analyte	Laboratory Method
		BZ34-014	2082605	748227	subsurface Soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-017	2082570	748219	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-018	2082569	748237	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-019	2082565	748273	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-020	2082567	748301	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-021	2082559	748334	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-022	2082539	748221	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ34-0034	2082662	748229	SAMPLE NOT TAKEN			
		BZ35-011	2082615	748395	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ35-012	2082582	748402	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ35-013	2082553	748380	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ35-014	2082640	748395	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260
		BZ35-015	2082586	748355	subsurface soil	B, C, D, E, F	Metals Radionuclides VOCs	6010 Alpha Spec 8260

Table 2
IHSS Group 400-10–Characterization Data Greater Than Background Mean Plus Two Standard Deviations or Method Detection Limit

IHSS Group	IHSS/PAC/UBC Site	Sampling Location	Easting	Northing	Media	Beginning Depth (ft)	Ending Depth (ft)	Analyte	Result	Bkgr+ 2SD	Tier I Action Level	Tier II Action Level	Unit
400-10	PAC 400-807 – Sandblasting Area	BZ35-001	2082600	748530	surface soil	0.00	0.50	Aluminum	24,400	16,902	1,000,000	1,000,000	mg/kg
		BZ35-001	2082600	748530	surface soil	0.00	0.50	Beryllium	1.1	0.97	133	1.33	mg/kg
		BZ35-001	2082600	748530	surface soil	0.00	0.50	Chromium	19.8	16.99	44,300	44,300	mg/kg
		BZ35-001	2082600	748530	surface soil	0.00	0.50	Lithium	12.4	11.55	40,900	40,900	mg/kg
		BZ35-001	2082600	748530	surface soil	0.00	0.50	Nickel	18.8	14.91	40,900	40,900	mg/kg
		BZ35-001	2082600	748530	surface soil	0.00	0.50	Uranium-235	0.22	0.094	113	24	pCi/g
		BZ35-002	2082628	748549	surface soil	0.00	0.50	Copper	33.4	18.06	75,600	75,600	mg/kg
		BZ35-002	2082628	748549	surface soil	0.00	0.50	Iron	28,800	18,037	613,000	613,000	mg/kg
		BZ35-002	2082628	748549	surface soil	0.00	0.50	Manganese	788	365.08	66,800	66,800	mg/kg
		BZ35-002	2082628	748549	surface soil	0.00	0.50	Uranium-235	0.157	0.0939	113	24	pCi/g
		BZ35-003	2082633	748514	surface soil	0.00	0.50	Copper	20.5	18.06	75,600	75,600	mg/kg
		BZ35-003	2082633	748514	surface soil	0.00	0.50	Iron	20,900	18,037	613,000	613,000	mg/kg
		BZ35-003	2082633	748514	surface soil	0.00	0.50	Uranium-235	0.26	0.09	113	24	pCi/g
		BZ35-003	2082633	748514	surface soil	0.00	0.50	Uranium-238	3.34	2	506	103	pCi/g
		BZ35-003	2082633	748514	surface soil	0.00	0.50	Zinc	80	73.76	613,000	613,000	mg/kg
		BZ35-004	2082613	748483	surface soil	0.00	0.50	Aluminum	21,700	16,902	1,000,000	1,000,000	mg/kg
		BZ35-004	2082613	748483	surface soil	0.00	0.50	Beryllium	1.1	0.97	133	1.33	mg/kg
		BZ35-004	2082613	748483	surface soil	0.00	0.50	Chromium	21.3	16.99	44,300	44,300	mg/kg
		BZ35-004	2082613	748483	surface soil	0.00	0.50	Iron	18,400	18,037	613,000	613,000	mg/kg
		BZ35-004	2082613	748483	surface soil	0.00	0.50	Lithium	15	11.55	40,900	40,900	mg/kg
		BZ35-004	2082613	748483	surface soil	0.00	0.50	Nickel	17.1	14.91	40,900	40,900	mg/kg
		BZ35-004	2082613	748483	surface soil	0.00	0.50	Zinc	81.3	73.76	613,000	613,000	mg/kg
		BZ35-006	2082539	748524	surface soil	0.00	0.80	Lithium	12.6	11.55	40,900	40,900	pCi/g
		BZ35-006	2082539	748524	surface soil	0.00	0.80	Uranium-235	0.14	0.09	113	24	pCi/g

IHSS Group	IHSS/PAC/UBC Site	Sampling Location	Easting	Northing	Media	Beginning Depth (ft)	Ending Depth (ft)	Analyte	Result	Bkgr+ 2SD	Tier I Action Level	Tier II Action Level	Unit
		BZ35-006	2082539	748524	surface soil	0.00	0.80	Uranium-238	2.06	2	506	103	pCi/g
	IHSS 120.2 – Fiberglass Area West of Building 664	BZ35-014	2082640	748395	subsurface soil			Toluene	5	NA	707,000	7,070	ug/mg
	IHSS 161 – Radioactive Area West of Building 664	BY34-001	2082524	748359	subsurface soil	4.00	6.00	Uranium-235	0.17	0.12	113	24	pCi/g
		BY34-001	2082524	748359	subsurface soil	4.00	6.00	Uranium-238	3.09	1.49	506	103	pCi/g
		BY34-001	2082524	748359	subsurface soil	6.00	8.00	Uranium-238	3.11	1.49	506	103	pCi/g
		BY34-001	2082524	748359	subsurface soil	4.00	6.00	Arsenic	21.60	13.14	381	3.81	mg/kg
		BY34-001	2082524	748359	subsurface soil	4.00	6.00	Cobalt	38.10	29.04	115,000	115,000	mg/kg
		BY34-001	2082524	748359	subsurface soil	4.00	6.00	Aluminum	41,000.00	35,373.17	1,000,000	1,000,000	mg/kg
		BY34-002	2082528	748323	subsurface soil	3.00	5.00	Uranium-235	0.16	0.12	113	24	pCi/g
		BY34-002	2082528	748323	subsurface soil	3.00	5.00	Uranium-238	2.66	1.49	506	103	pCi/g
		BY34-002	2082528	748323	subsurface soil	5.00	7.00	Uranium-238	3.21	1.49	506	103	pCi/g
		BY34-002	2082528	748323	subsurface soil	5.0	7.0	Acetone	5.80	NA	27,200,000	272,000	ug/kg
		BY34-002	2082528	748323	subsurface soil	5.0	7.0	Methylene Chloride	2.20	NA	578	5.78	ug/kg
		BY34-002	2082528	748323	subsurface soil	3.0	5.0	Methylene Chloride	2.60	NA	578	5.78	ug/kg
		BY34-003	2082539.00	748279.00	subsurface soil	6.50	8.50	Uranium-235	0.12	0.12	113	24	pCi/g
		BY34-003	2082539.00	748279.00	subsurface soil	8.50	10.50	Uranium-238	1.68	1.49	506	103	pCi/g
		BY34-003	2082539.00	748279.00	subsurface soil	6.50	8.50	Uranium-238	2.45	1.49	506	103	pCi/g
		BY34-003	2082539.00	748279.00	subsurface soil	6.5	8.5	Acetone	5.90	NA	27,200,000	272,000	ug/kg
		BY34-003	2082539.00	748279.00	subsurface soil	8.5	10.5	Methylene Chloride	1.20	NA	578	5.78	ug/kg
		BY34-003	2082539.00	748279.00	subsurface soil	6.5	8.5	Methylene Chloride	1.40	NA	578	5.78	ug/kg
		BY34-004	2082536.00	748252.00	subsurface soil	6.50	8.50	Uranium-235	0.16	0.12	113	24	pCi/g
		BY34-004	2082536.00	748252.00	subsurface soil	6.50	8.50	Uranium-238	1.76	1.49	506	103	pCi/g
		BY34-004	2082536.00	748252.00	subsurface soil	4.50	6.50	Uranium-238	2.09	1.49	506	103	pCi/g
		BY34-004	2082536.00	748252.00	subsurface soil	4.50	6.50	Aluminum	40,800.00	35,373.17	1,000,000	1,000,000	mg/kg
		BY34-004	2082536.00	748252.00	subsurface soil	4.5	6.5	Acetone	15,000	NA	27,200,000	272,000	ug/kg
		BY34-004	2082536.00	748252.00	subsurface soil	6.5	8.5	Methylene Chloride	1,200	NA	578	5.78	ug/kg

IHSS Group	IHSS/PAC/UBC Site	Sampling Location	Easting	Northing	Media	Beginning Depth (ft)	Ending Depth (ft)	Analyte	Result	Bkgr+ 2SD	Tier I Action Level	Tier II Action Level	Unit
		BY34-004	2082536.00	748252.00	subsurface soil	4.5	6.5	Methylene Chloride	1.40	NA	578	5.78	ug/kg
		BY34-005	2082507.00	748232.00	subsurface soil	4.50	6.50	Uranium-235	0.19	0.12	113	24	pCi/g
		BY34-005	2082507.00	748232.00	subsurface soil	2.50	4.50	Uranium-235	0.27	0.12	113	24	pCi/g
		BY34-005	2082507.00	748232.00	subsurface soil	2.50	4.50	Uranium-238	1.88	1.49	506	103	pCi/g
		BY34-005	2082507.00	748232.00	subsurface soil	2.50	4.50	Arsenic	14.60	13.14	381	3.81	mg/kg
		BY34-005	2082507.00	748232.00	subsurface soil	2.50	4.50	Aluminum	48,000.00	35,373.17	1,000,000	1,000,000	pCi/g
		BY34-005	2082507.00	748232.00	subsurface soil	4.5	6.5	Acetone	5.50	NA	27,200,000	272,000	ug/kg
		BY34-005	2082507.00	748232.00	subsurface soil	4.5	6.5	Methylene Chloride	1.10	NA	578	5.78	ug/kg
		BY34-005	2082507.00	748232.00	subsurface soil	2.5	4.5	Methylene Chloride	1.40	NA	578	5.78	ug/kg
		BY34-006	2082508.00	748260.00	subsurface soil	4.50	6.50	Uranium-235	0.24	0.12	113	24	pCi/g
		BY34-006	2082508.00	748260.00	subsurface soil	2.50	4.50	Uranium-238	2.63	1.49	506	103	pCi/g
		BY34-006	2082508.00	748260.00	subsurface soil	4.5	6.5	Acetone	8.30	NA	27,200,000	272,000	ug/kg
		BY34-006	2082508.00	748260.00	subsurface soil	2.5	4.5	Acetone	13.00	NA	27,200,000	272,000	ug/kg
		BY34-006	2082508.00	748260.00	subsurface soil	4.5	6.5	Methylene Chloride	1.10	NA	578	5.78	ug/kg
		BY34-006	2082508.00	748260.00	subsurface soil	2.5	4.5	Methylene Chloride	1.30	NA	578	5.78	ug/kg
		BY34-007	2082496.00	748326.00	subsurface soil	4.50	6.20	Uranium-235	0.20	0.12	113	24	pCi/g
		BY34-007	2082496.00	748326.00	subsurface soil	6.20	8.00	Uranium-235	0.21	0.12	113	24	pCi/g
		BY34-007	2082496.00	748326.00	subsurface soil	6.20	8.00	Uranium-238	2.58	1.49	506	103	pCi/g
		BY34-007	2082496.00	748326.00	subsurface soil	4.50	6.20	Arsenic	15.80	13.14	381	3.81	mg/kg
		BY34-007	2082496.00	748326.00	subsurface soil	6.2	8.0	Acetone	13.00	NA	27,200,000	272,000	ug/kg
		BY34-008	2082478.00	748223.00	subsurface soil	4.50	6.50	Uranium-238	1.50	1.49	506	103	pCi/g
		BY34-008	2082478.00	748223.00	subsurface soil	2.5	4.5	Methylene Chloride	1.40	NA	578	5.78	ug/kg
		BY34-008	2082478.00	748223.00	subsurface soil	4.5	6.5	Methylene Chloride	1.40	NA	578	5.78	ug/kg
		BY34-011	2082499	748302	subsurface soil	4.50	6.50	Uranium-235	0.21	0.12	113	24	pCi/g
		BY34-011	2082499	748302	subsurface soil	2.50	4.50	Uranium-235	0.23	0.12	113	24	pCi/g
		BY34-011	2082499	748302	subsurface soil	2.50	4.50	Arsenic	14.20	13.14	381	3.81	mgkg
		BY34-011	2082499	748302	subsurface soil	4.5	6.5	Acetone	5.600	NA	27,200,000	272,000	ug/kg
		BY34-011	2082499	748302	subsurface soil	2.5	4.5	Acetone	5.800	NA	27,200,000	272,000	ug/kg

IHSS Group	IHSS/PAC/UBC Site	Sampling Location	Easting	Northing	Media	Beginning Depth (ft)	Ending Depth (ft)	Analyte	Result	Bkgr+ 2SD	Tier I Action Level	Tier II Action Level	Unit
		BY34-011	2082499	748302	subsurface soil	2.5	4.5	Methylene Chloride	2.40	NA	578	5.78	ug/kg
		BY34-011	2082499	748302	subsurface soil	4.5	6.5	Methylene Chloride	2.50	NA	578	5.78	ug/kg
		BY35-001	2082520	748395	subsurface soil	0.50	2.70	Uranium-235	0.19	0.12	113	24	pCi/g
		BY35-001	2082520	748395	subsurface soil	2.50	4.50	Uranium-235	0.25	0.12	113	24	pCi/g
		BY35-001	2082520	748395	subsurface soil	2.50	4.50	Uranium-238	2.13	1.49	506	103	pCi/g
		BY35-001	2082520	748395	subsurface soil	0.50	2.70	Uranium-238	2.90	1.49	506	103	pCi/g
		BY35-001	2082520	748395	subsurface soil	2.70	4.50	Lead	63.80	24.97	1,000	1,000	mg/kg
		BY35-001	2082520	748395	subsurface soil	0.5	2.7	Naphthalene	1.70	NA	10,100,000	101,000	ug/kg
		BY35-001	2082520	748395	subsurface soil	2.7	4.5	Toluene	0.94	NA	707,000	7,070	ug/kg
		BY35-002	2082491	748374	subsurface soil	2.50	4.50	Uranium-235	0.21	0.12	113	24	pCi/g
		BY35-002	2082491	748374	subsurface soil	0.50	2.50	Uranium-238	2.35	1.49	506	103	pCi/g
		BY35-002	2082491	748374	subsurface soil	2.50	4.50	Uranium-238	2.89	1.49	506	103	pCi/g
		BY35-002	2082491	748374	subsurface soil	2.5	4.5	Naphthalene	2.80	NA	10,100,000	101,000	ug/kg
		BY35-002	2082491	748374	subsurface soil	2.5	4.5	2-Butanone	8.90	NA	1,000,000,000	1,000,000,000	ug/kg
		BY35-002	2082491	748374	subsurface soil	2.5	4.5	Methylene Chloride	0.94	NA	578	5.78	ug/kg
		BY35-003	2082487	748410	subsurface soil	0.50	2.50	Uranium-235	0.12	0.12	113	24	pCi/g
		BY35-003	2082487	748410	subsurface soil	2.50	4.50	Uranium-235	0.16	0.12	113	24	pCi/g
		BY35-003	2082487	748410	subsurface soil	0.5	2.5	Acetone	7.10	NA	27,200,000	272,000	ug/kg
		BY35-003	2082487	748410	subsurface soil	2.5	4.5	Methylene Chloride	0.94	NA	578	5.78	ug/kg
		BZ34-001	2082543	748339	subsurface soil	0.5	2.5	Methylene Chloride	0.89	NA	578	5.78	ug/kg
		BZ34-001	2082543	748339	subsurface soil	2.5	4.5	Methylene Chloride	1.00	NA	578	5.78	ug/kg
		BZ34-001	2082543	748339	subsurface soil	4.5	6.5	Methylene Chloride	1.00	NA	578	5.78	ug/kg
		BZ34-001	2082543	748339	subsurface soil	6.5	8.5	Methylene Chloride	1.10	NA	578	5.78	ug/kg
		BZ34-002	2082656	748302	subsurface soil	6.00	8.00	Uranium-238	3.26	1.49	506	103	pCi/g
		BZ34-002	2082656	748302	subsurface soil	4.00	6.00	Uranium-238	3.71	1.49	506	103	pCi/g
		BZ34-002	2082656	748302	subsurface soil	4.0	6.0	Methylene Chloride	1.50	NA	578	5.78	ug/kg
		BZ34-002	2082656	748302	subsurface soil	6.0	8.0	Methylene Chloride	1.50	NA	578	5.78	ug/kg
		BZ34-003	2082660	748265	subsurface soil	3.40	6.00	Uranium-235	0.18	0.12	113	24	pCi/g

IHSS Group	IHSS/PAC/UBC Site	Sampling Location	Easting	Northing	Media	Beginning Depth (ft)	Ending Depth (ft)	Analyte	Result	Bkgr+ 2SD	Tier I Action Level	Tier II Action Level	Unit
		BZ34-003	2082660	748265	subsurface soil	3.40	6.00	Uranium-238	2.35	1.49	506	103	pCi/g
		BZ34-003	2082660	748265	subsurface soil	6.00	8.00	Uranium-238	2.44	1.49	506	103	pCi/g
		BZ34-003	2082660	748265	subsurface soil	3.40	6.00	Arsenic	17.30	13.14	381	3.81	mg/kg
		BZ34-003	2082660	748265	subsurface soil	3.40	6.00	Aluminum	40,800.00	35,373.17	1,000,000	1,000,000	mg/kg
		BZ34-003	2082660	748265	subsurface soil	3.4	6.0	Acetone	11.00	NA	27,200,000	272,000	ug/kg
		BZ34-003	2082660	748265	subsurface soil	6.0	8.0	Acetone	15.00	NA	27,200,000	272,000	ug/kg
		BZ34-003	2082660	748265	subsurface soil	3.4	6.0	Methylene Chloride	1.40	NA	578	5.78	ug/kg
		BZ34-003	2082660	748265	subsurface soil	6.0	8.0	Methylene Chloride	1.40	NA	578	5.78	ug/kg
		BZ34-004	2082663	748229	subsurface soil	6.00	8.00	Uranium-235	0.20	0.12	113	24	pCi/g
		BZ34-004	2082663	748229	subsurface soil	6.00	8.00	Uranium-238	1.90	1.49	506	103	pCi/g
		BZ34-004	2082663	748229	subsurface soil	6.0	8.0	Acetone	6.10	NA	27,200,000	272,000	ug/kg
		BZ34-004	2082663	748229	subsurface soil	4.0	6.0	Methylene Chloride	1.10	NA	578	5.78	ug/kg
		BZ34-004	2082663	748229	subsurface soil	6.0	8.0	Methylene Chloride	1.20	NA	578	5.78	ug/kg
		BZ34-007	2082634	748205	subsurface soil	0.50	2.50	Uranium-235	0.14	0.12	113	24	pCi/g
		BZ34-007	2082634	748205	subsurface soil	2.50	4.50	Uranium-235	0.21	0.12	113	24	pCi/g
		BZ34-007	2082634	748205	subsurface soil	0.50	2.50	Uranium-238	2.11	1.49	506	103	pCi/g
		BZ34-007	2082634	748205	subsurface soil	2.50	4.50	Uranium-238	2.57	1.49	506	103	pCi/g
		BZ34-007	2082634	748205	subsurface soil	0.5	2.5	Methylene Chloride	1.30	NA	578	5.78	ug/kg
		BZ34-007	2082634	748205	subsurface soil	2.5	4.5	Methylene Chloride	1.50	NA	578	5.78	ug/kg
		BZ34-008	2082632	748244	subsurface soil	6.00	8.00	Uranium-235	0.18	0.12	113	24	pCi/g
		BZ34-008	2082632	748244	subsurface soil	4.00	6.00	Uranium-235	0.21	0.12	113	24	pCi/g
		BZ34-008	2082632	748244	subsurface soil	4.00	6.00	Uranium-238	1.84	1.49	506	103	pCi/g
		BZ34-008	2082632	748244	subsurface soil	4.00	6.00	Aluminum	45,500.00	35,373.17	1,000,000	1,000,000	mg/kg
		BZ34-008	2082632	748244	subsurface soil	4.0	6.0	Acetone	21.00	NA	27,200,000	272,000	ug/kg
		BZ34-008	2082632	748244	subsurface soil	4.0	6.0	Methylene Chloride	1.20	NA	578	5.78	ug/kg
		BZ34-008	2082632	748244	subsurface soil	6.0	8.0	Methylene Chloride	1.30	NA	578	5.78	ug/kg
		BZ34-009	2082623	748315	subsurface soil	6.00	8.00	Uranium-235	0.19	0.12	113	24	pCi/g
		BZ34-009	2082623	748315	subsurface soil	4.10	6.00	Uranium-235	0.25	0.12	113	24	pCi/g

IHSS Group	IHSS/PAC/UBC Site	Sampling Location	Easting	Northing	Media	Beginning Depth (ft)	Ending Depth (ft)	Analyte	Result	Bkgr+ 2SD	Tier I Action Level	Tier II Action Level	Unit
		BZ34-009	2082623	748315	subsurface soil	6.00	8.00	Uranium-238	3.27	1.49	506	103	pCi/g
		BZ34-009	2082623	748315	subsurface soil	4.10	6.00	Arsenic	14.10	13.14	381	3.81	mg/kg
		BZ34-009	2082623	748315	subsurface soil	6.0	8.0	Acetone	6.20	NA	27,200,000	272,000	ug/kg
		BZ34-009	2082623	748315	subsurface soil	4.1	6.0	Acetone	13.00	NA	27,200,000	272,000	ug/kg
		BZ34-009	2082623	748315	subsurface soil	4.1	6.0	Methylene Chloride	2.30	NA	578	5.78	ug/kg
		BZ34-009	2082623	748315	subsurface soil	6.0	8.0	Methylene Chloride	2.50	NA	578	5.78	ug/kg
		BZ34-010	2082619	748351	subsurface soil	5.00	7.00	Uranium-235	0.29	0.12	113	24	pCi/g
		BZ34-010	2082619	748351	subsurface soil	5.00	7.00	Uranium-238	3.61	1.49	506	103	pCi/g
		BZ34-010	2082619	748351	subsurface soil	5.00	7.00	Arsenic	18.10	13.14	381	3.81	mg/kg
		BZ34-010	2082619	748351	subsurface soil	5.00	7.00	Aluminum	35,500.00	35,373.17	1,000,000	1,000,000	mg/kg
		BZ34-010	2082619	748351	subsurface soil	5.0	7.0	Acetone	9.40	NA	27,200,000	272,000	ug/kg
		BZ34-010	2082619	748351	subsurface soil	7.0	9.0	Acetone	13.00	NA	27,200,000	272,000	ug/kg
		BZ34-010	2082619	748351	subsurface soil	7.0	9.0	Methylene Chloride	2.50	NA	578	5.78	ug/kg
		BZ34-010	2082619	748351	subsurface soil	5.0	7.0	Methylene Chloride	2.60	NA	578	5.78	ug/kg
		BZ34-011	2082591	748319	subsurface soil	4.50	6.00	Uranium-235	0.18	0.12	113	24	pCi/g
		BZ34-011	2082591	748319	subsurface soil	6.00	8.00	Uranium-235	0.19	0.12	113	24	pCi/g
		BZ34-011	2082591	748319	subsurface soil	6.00	8.00	Uranium-238	5.74	1.49	506	103	pCi/g
		BZ34-011	2082591	748319	subsurface soil	6.00	8.00	Arsenic	14.00	13.14	381	3.81	mg/kg
		BZ34-011	2082591	748319	subsurface soil	6.00	8.00	Aluminum	43,600.00	35,373.17	1,000,000	1,000,000	mg/kg
		BZ34-011	2082591	748319	subsurface soil	6.0	8.0	Acetone	6.20	NA	27,200,000	272,000	ug/kg
		BZ34-011	2082591	748319	subsurface soil	4.5	6.0	Acetone	11.00	NA	27,200,000	272,000	ug/kg
		BZ34-011	2082591	748319	subsurface soil	6.0	8.0	Methylene Chloride	1.80	NA	578	5.78	ug/kg
		BZ34-011	2082591	748319	subsurface soil	4.5	6.0	Methylene Chloride	2.10	NA	578	5.78	ug/kg
		BZ34-012	2082594	748294	subsurface soil	6.00	8.00	Uranium-235	0.27	0.12	113	24	pCi/g
		BZ34-012	2082594	748294	subsurface soil	4.00	6.00	Uranium-238	1.90	1.49	506	103	pCi/g
		BZ34-012	2082594	748294	subsurface soil	4.0	6.0	Methylene Chloride	1.20	NA	578	5.78	ug/kg
		BZ34-012	2082594	748294	subsurface soil	6.0	8.0	Methylene Chloride	1.20	NA	578	5.78	ug/kg
		BZ34-013	2082599	748259	subsurface soil	6.00	8.00	Uranium-235	0.17	0.12	113	24	pCi/g

IHSS Group	IHSS/PAC/UBC Site	Sampling Location	Easting	Northing	Media	Beginning Depth (ft)	Ending Depth (ft)	Analyte	Result	Bkgr+ 2SD	Tier I Action Level	Tier II Action Level	Unit
		BZ34-013	2082599	748259	subsurface soil	4.00	6.00	Uranium-235	0.27	0.12	113	24	pCi/g
		BZ34-013	2082599	748259	subsurface soil	6.0	8.0	Acetone	7.00	NA	27,200,000	272,000	ug/kg
		BZ34-013	2082599	748259	subsurface soil	6.0	8.0	Methylene Chloride	1.60	NA	578	5.78	ug/kg
		BZ34-013	2082599	748259	subsurface soil	4.0	6.0	Methylene Chloride	2.30	NA	578	5.78	ug/kg
		BZ34-014	2082605	748227	subsurface soil	6.00	8.00	Uranium-238	1.80	1.49	506	103	pCi/g
		BZ34-014	2082605	748227	subsurface soil	4.00	6.00	Uranium-238	3.32	1.49	506	103	pCi/g
		BZ34-014	2082605	748227	subsurface soil	6.0	8.0	Acetone	7.10	NA	27,200,000	272,000	ug/kg
		BZ34-014	2082605	748227	subsurface soil	6.0	8.0	Methylene Chloride	1.80	NA	578	5.78	ug/kg
		BZ34-014	2082605	748227	subsurface soil	4.0	6.0	Methylene Chloride	2.70	NA	578	5.78	ug/kg
		BZ34-017	2082570	748219	subsurface soil	3.00	5.00	Uranium-235	0.14	0.12	113	24	pCi/g
		BZ34-017	2082570	748219	subsurface soil	5.00	7.00	Uranium-235	0.15	0.12	113	24	pCi/g
		BZ34-017	2082570	748219	subsurface soil	5.00	7.00	Uranium-238	1.88	1.49	506	103	pCi/g
		BZ34-017	2082570	748219	subsurface soil	3.00	5.00	Uranium-238	2.03	1.49	506	103	pCi/g
		BZ34-017	2082570	748219	subsurface soil	5.0	7.0	Methylene Chloride	1.20	NA	578	5.78	ug/kg
		BZ34-017	2082570	748219	subsurface soil	3.0	5.0	Methylene Chloride	1.30	NA	578	5.78	ug/kg
		BZ34-018	2082569	748237	subsurface soil	4.00	6.00	Uranium-238	1.79	1.49	506	103	pCi/g
		BZ34-018	2082569	748237	subsurface soil	6.0	8.0	Methylene Chloride	1.30	NA	578	5.78	ug/kg
		BZ34-018	2082569	748237	subsurface soil	4.0	6.0	Methylene Chloride	1.80	NA	578	5.78	ug/kg
		BZ34-019	2082565	748273	subsurface soil	6.50	8.50	Uranium-235	0.19	0.12	113	24	pCi/g
		BZ34-019	2082565	748273	subsurface soil	4.50	6.50	Uranium-235	0.19	0.12	113	24	pCi/g
		BZ34-019	2082565	748273	subsurface soil	4.50	6.50	Uranium-238	1.90	1.49	506	103	pCi/g
		BZ34-019	2082565	748273	subsurface soil	6.5	8.5	Methylene Chloride	1.40	NA	578	5.78	ug/kg
		BZ34-019	2082565	748273	subsurface soil	4.5	6.5	Methylene Chloride	1.60	NA	578	5.78	ug/kg
		BZ34-020	2082567	748301	subsurface soil	4.00	6.00	Uranium-235	0.17	0.12	113	24	pCi/g
		BZ34-020	2082567	748301	subsurface soil	6.00	8.00	Uranium-235	0.23	0.12	113	24	pCi/g
		BZ34-020	2082567	748301	subsurface soil	4.00	6.00	Uranium-238	2.04	1.49	506	103	pCi/g
		BZ34-020	2082567	748301	subsurface soil	6.00	8.00	Uranium-238	2.32	1.49	506	103	pCi/g
		BZ34-020	2082567	748301	subsurface soil	4.0	6.0	Methylene Chloride	1.30	NA	578	5.78	ug/kg

IHSS Group	IHSS/PAC/UBC Site	Sampling Location	Easting	Northing	Media	Beginning Depth (ft)	Ending Depth (ft)	Analyte	Result	Bkgr+ 2SD	Tier I Action Level	Tier II Action Level	Unit
		BZ34-020	2082567	748301	subsurface soil	6.0	8.0	Methylene Chloride	1.700	NA	578	5.78	ug/kg
		BZ34-021	2082559	748334	subsurface soil	4.50	6.50	Uranium-235	0.19	0.12	113	24	pCi/g
		BZ34-021	2082559	748334	subsurface soil	2.50	4.50	Uranium-235	0.20	0.12	113	24	pCi/g
		BZ34-021	2082559	748334	subsurface soil	4.50	6.50	Uranium-238	3.24	1.49	506	103	pCi/g
		BZ34-021	2082559	748334	subsurface soil	2.50	4.50	Uranium-238	3.81	1.49	506	103	pCi/g
		BZ34-021	2082559	748334	subsurface soil	4.50	6.50	Aluminum	36,200.00	35,373.17	1,000,000	1,000,000	mg/kg
		BZ34-021	2082559	748334	subsurface soil	2.5	4.5	Acetone	5.10	NA	27,200,000	272,000	ug/kg
		BZ34-021	2082559	748334	subsurface soil	4.5	6.5	Methylene Chloride	2.30	NA	578	5.78	ug/kg
		BZ34-021	2082559	748334	subsurface soil	2.5	4.5	Methylene Chloride	2.80	NA	578	5.78	ug/kg
		BZ34-022	2082539	748221	subsurface soil	6.10	8.10	Uranium-235	0.23	0.12	113	24	pCi/g
		BZ34-022	2082539	748221	subsurface soil	6.10	8.10	Uranium-238	3.42	1.49	506	103	pCi/g
		BZ34-022	2082539	748221	subsurface soil	4.10	6.10	Aluminum	38,500.00	35,373.17	1,000,000	1,000,000	mg/kg
		BZ34-022	2082539	748221	subsurface soil	2.5	4.5	Methylene Chloride	2.80	NA	578	5.78	ug/kg
		BZ34-022	2082539	748221	subsurface soil	6.1	8.1	Acetone	9.90	NA	27,200,000	272,000	ug/kg
		BZ34-022	2082539	748221	subsurface soil	4.1	6.1	Methylene Chloride	1.40	NA	578	5.78	ug/kg
		BZ34-022	2082539	748221	subsurface soil	6.1	8.1	Methylene Chloride	2.40	NA	578	5.78	ug/kg
		BZ35-008	2082651	748444	subsurface soil	2.5	4.5	Methylene Chloride	1.70	NA	578	5.78	ug/kg
		BZ35-008	2082651	748444	subsurface soil	0.5	2.5	Methylene Chloride	1.80	NA	578	5.78	ug/kg
		BZ35-008	2082651	748444	subsurface soil	4.5	6.5	Methylene Chloride	1.80	NA	578	5.78	ug/kg
		BZ35-008	2082651	748444	subsurface soil	8.5	10.5	Methylene Chloride	2.30	NA	578	5.78	ug/kg
		BZ35-010	2082642	748372	subsurface soil	6.5	8.5	Acetone	5.50	NA	27,200,000	272,000	ug/kg
		BZ35-010	2082642	748372	subsurface soil	2.5	4.5	2-Butanone	10.00	NA	1,000,000,000	1,000,000,000	ug/kg
		BZ35-010	2082642	748372	subsurface soil	2.5	4.5	Toluene	0.96	NA	707,000	7,070	ug/kg
		BZ35-010	2082642	748372	subsurface soil	0.5	2.5	Methylene Chloride	1.10	NA	578	5.78	ug/kg
		BZ35-010	2082642	748372	subsurface soil	0.5	2.5	Toluene	4.40	NA	707,000	7,070	ug/kg
		BZ35-011	2082615	748395	subsurface soil	4.5	6.8	2-Butanone	13.00	NA	1,000,000,000	1,000,000,000	ug/kg
		BZ35-011	2082615	748395	subsurface soil	4.50	6.80	Uranium-235	0.19	0.12	113	24	pCi/g
		BZ35-011	2082615	748395	subsurface soil	6.80	9.00	Uranium-235	0.22	0.12	113	24	pCi/g

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		BZ35-011	2082615	748395	subsurface soil	4.50	6.80	Uranium-238	2.03	1.49	506	103	pCi/g
		BZ35-011	2082615	748395	subsurface soil	6.80	9.00	Uranium-238	2.52	1.49	506	103	pCi/g
		BZ35-012	2082582	748402	subsurface soil	6.00	8.00	Uranium-235	0.26	0.12	113	24	pCi/g
		BZ35-012	2082582	748402	subsurface soil	8.00	10.00	Uranium-235	0.35	0.12	113	24	pCi/g
		BZ35-012	2082582	748402	subsurface soil	8.00	10.00	Uranium-238	2.96	1.49	506	103	pCi/g
		BZ35-012	2082582	748402	subsurface soil	6.00	8.00	Uranium-238	3.05	1.49	506	103	pCi/g
		BZ35-013	2082553	748380	subsurface soil	6.00	7.40	Uranium-235	0.15	0.12	113	24	pCi/g
		BZ35-013	2082553	748380	subsurface soil	5.50	6.00	Uranium-235	0.18	0.12	113	24	pCi/g
		BZ35-013	2082553	748380	subsurface soil	5.50	6.00	Uranium-238	1.69	1.49	506	103	pCi/g
		BZ35-013	2082553	748380	subsurface soil	6.00	7.40	Uranium-238	2.72	1.49	506	103	pCi/g
		BZ35-013	2082553	748380	subsurface soil	6.00	7.40	Strontium	214.00	211.38	1,000,000	1,000,000	mgkg
		BZ35-013	2082553	748380	subsurface soil	5.5	6.0	Toluene	0.96	NA	707,000	7,070	ug/kg
		BZ35-014	2082640	748395	subsurface soil	4.5	6.5	2-Butanone	6.40	NA	1,000,000,000	1,000,000,000	ug/kg
		BZ35-014	2082640	748395	subsurface soil	0.5	2.5	Methylene Chloride	0.92	NA	578	5.78	ug/kg
		BZ35-014	2082640	748395	subsurface soil	6.5	8.5	Methylene Chloride	0.96	NA	578	5.78	ug/kg
		BZ35-015	2082586	748355	subsurface soil	6.00	8.00	Uranium-235	0.24	0.12	113	24	pCi/g
		BZ35-015	2082586	748355	subsurface soil	4.00	6.00	Uranium-235	0.28	0.12	113	24	pCi/g
		BZ35-015	2082586	748355	subsurface soil	4.00	6.00	Uranium-238	2.22	1.49	506	103	pCi/g
		BZ35-015	2082586	748355	subsurface soil	4.00	6.00	Arsenic	18.90	13.14	381	3.81	mgkg
		BZ35-015	2082586	748355	subsurface soil	4.0	6.0	Acetone	11.00	NA	27,200,000	272,000	ug/kg
		BZ35-015	2082586	748355	subsurface soil	4.0	6.0	Toluene	1.10	NA	707,000	7,070	ug/kg

SD = Standard Deviation

Table 3
Summary Statistics for IHSS 120.2 Subsurface Soil

Analyte	Total Number Samples Collected	Detection Frequency (%)	Maximum Concentration Detected	Tier I Action Level	Tier II Action Level	Subsurface Soil Background Concentration	Unit
2-Butanone	20	15	46	NA	NA	NA	ug/kg
2-Ethyl-1-Hexanol	1	100	5.6	NA	NA	NA	ug/kg
Acetone	20	30	230	27,200,000	272,000	NA	ug/kg
Methylene Chloride	20	60	2.3	578	5.78	NA	ug/kg
Thallium	4	25	2.9	NA	NA	1.84	mg/kg
Toluene	20	20	7.5	707,000	7,070	NA	ug/kg

Table 4
Summary Statistics for IHSS 161 Subsurface Soil

Analyte	Total Number Samples Collected	Detection Frequency (%)	Maximum Concentration Detected	Tier I Action Level	Tier II Action Level	Subsurface Soil Background Concentration	Unit
2-Butanone	71	7	46	NA	NA	NA	ug/kg
Acetone	71	48	230	27,200,000	272,000	NA	ug/kg
Aluminum	57	16	48,000	1,000,000	1,000,000	35,373.17	mg/kg
Arsenic	57	16	21.6	381	3.81	13.14	mg/kg
Benzene 1,2,4-Trimethyl	71	1	2	NA	NA	NA	ug/kg
Calcium	57	2	217,000	NA	NA	39,382.27	mg/kg
Cobalt	57	2	38.1	123,000	123,000	29.04	mg/kg
Lead	57	2	63.8	1,000	1,000	24.97	mg/kg
Methylene Chloride	71	73	2.8	578	5.78	NA	ug/kg
n-Eicosane	1	100	8	NA	NA	NA	ug/kg
n-Tetradecane	1	100	10	NA	NA	NA	ug/kg
Napththalene	71	4	6.5	10,100,000	101,000	NA	ug/kg
Strontium	57	2	214	1,000,000	1,000,000	211.38	mg/kg
Thallium	57	58	4.8	NA	NA	1.84	mg/kg
Toluene	71	7	7.5	707,000	7,070	NA	ug/kg
Uranium-235	81	72	0.35	113	24	0.12	pCi/g
Uranium-238	81	70	5.74	506	103	1.49	pCi/g

Table 5
Summary Statistics for PAC 400-807 Surface Soil

Analyte	Total Number Samples Collected	Detection Frequency (%)	Maximium Concentration Detected	Tier I Action Level	Tier II Action Level	Surface Soil Background Concentration	Unit
9,10-Anthraquinone	1	100	1,300	NA	NA	NA	ug/kg
Acenapthhene	5	40	260	123,000,000	123,000,000	NA	ug/kg
Aluminum	6	33	24,400	1,000,000	1,000,000	16,902	mg/kg
Anthracene	5	40	440	613,000,000	613,000,000	NA	ug/kg
Benzo(a)anthracene	5	40	1,600	784,000	7840	NA	ug/kg
Benzo(a)Pyrene	5	40	970	78,400	784	NA	ug/kg
Benzo(b)Fluoranthene	5	40	1,100	784,000	7840	NA	ug/kg
Benzo(ghi)Perylene	5	40	620	NA	NA	NA	ug/kg
Benzo(k)Fluoranthene	5	40	1,300	7,840,000	78,400	NA	ug/kg
Beryllium	6	33	1.1	133	1.33	0.97	mg/kg
Bis(2-Ethylhexyl)Phthalate	5	40	570	40,900,000	409,000	NA	ug/kg
Calcium	6	50	25,800	NA	NA	4467	mg/kg
Chromium	6	33	21.3	NA	NA	16.99	mg/kg
Chrysene	5	40	2,100	78,400,000	784,000	NA	ug/kg
Copper	6	33	33.4	75,600	75,600	18.06	mg/kg
Dibenzo(a,h)Anthracene	5	40	270	78,400	784	NA	ug/kg
Fluoranthene	5	40	4,100	81,800,000	81,800,000	NA	ug/kg
Fluorene	5	20	190	81,800,000	81,800,000	NA	ug/kg
Fluorenone	1	100	860	NA	NA	NA	ug/kg
Indeno(1,2,3-cd)Pyrene	5	40	570	784,000	7,840	NA	ug/kg
Iron	6	50	28,800	613,000	613,000	18,037	mg/kg
Lithium	6	50	15	40,900	40,900	11.55	mg/kg
Magnesium	6	50	9,980	NA	NA	2,849.3	mg/kg
Manganese	6	17	788	66,800	66,800	365.08	mg/kg

Analyte	Total Number Samples Collected	Detection Frequency (%)	Maximium Concentration Detected	Tier I Action Level	Tier II Action Level	Surface Soil Background Concentration	Unit
Nickel	6	33	18.8	40,900	40,900	14.91	mg/kg
p-Toluenesulfonamide	2	100	600	NA	NA	NA	ug/kg
Phenanthrene	5	60	1,500	NA	NA	NA	ug/kg
Potassium	6	17	3,320	NA	NA	2,967.2	mg/kg
Pyrene	5	60	4,000	61,300,000	61,300,000	NA	ug/kg
Sodium	6	100	1,720	NA	NA	91.84	mg/kg
Uranium-235	6	67	0.26	113	24	0.094	pCi/g
Uranium-238	6	33	3.34	506	103	2	pCi/g
Zinc	6	33	81.3	613,000	613,000	73.76	mg/kg

Table 6
Summary Statistics for PAC 400-807 Subsurface Soil

Analyte	Total Number Samples Collected	Detection Frequency (%)	Maximum Concentration Detected	Tier I Action Level	Tier II Action Level	Subsurface Soil Background Concentration	Unit
Uranium-235	2	50	0.14	113	24	0.12	pCi/g
Uranium-238	2	50	2.06	506	103	1.49	pCi/g

4.1 Subsurface Soil Risk Screen

Screen 1 – Are COC concentrations below Table 3 WRW Soil ALs?

Yes, all COC concentrations are well below Table 3 ALs for the WRW. (Screens 2 and 3 are bypassed)

Screen 4 – Is there an environmental pathway and sufficient quantity of COC that would cause exceedance of Surface Water Standards?

Migration via erosion and groundwater are the two possible pathways whereby surface water could become contaminated by soil from IHSS Group 400-10. Contaminant migration via erosion is unlikely because this IHSS Group is located in a flat-lying area not prone to landslides or erosion (Figure 1, RFCA Modification [DOE et al. 2003]).

Groundwater and surface water flow in this area is to the southeast towards the South Interceptor Ditch approximately 450 feet away. Groundwater monitoring results from nearby well P416889, indicate that all analytes are below reportable limits (DOE 2001c).. This well is within the composite IA volatile organic compound (VOC) plume and will be evaluated as part of groundwater plume remedial decision and future sitewide evaluation.

Surface water station GS22 is the closest surface water station to IHSS Group 400-10. And measures water from the 400 Area. Recent analytical results (DOE 2002a, 2002b, and 2003) indicate that all analytes are present at concentrations less than RFCA standards and ALs.

Screen 5 – Are COC concentrations below the Table 3 Soil Action Levels for ecological receptors?

Yes, all COC concentrations are less than the Table 3 ALs for ecological receptors.

4.2 Summary

Analytical results and the soil risk screen indicate that an NFAA determination is justified for IHSS Group 400-10. Approval of this Data Summary Report constitutes regulatory agency concurrence that this IHSS Group is an NFAA site. This information and the NFAA determination will be documented in the FY03 HRR.

3.0 DEVIATIONS FROM PLANNED SAMPLING SPECIFICATIONS

Deviations from the planned sampling specifications described in IASAP Addendum #IA-02-01 (DOE 2001b) are presented in the following table.

Table 7
Deviations from Planned Sampling Specifications

Sampling Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Comments
BZ35-001	2082600	748530	2082600.042	748530.030	No significant change
BZ35-002	2082629	748551	2082628.699	748549.759	No significant change

Sampling Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Comments
BZ35-003	2082633	748516	2082633.128	748514.006	No significant change
BZ35-004	2082604	748494	2082613.790	748483.805	Relocated because of utilities
BZ35-005	2082542	748488	2082530.528	748477.754	Relocated because of utilities
BZ35-006	2082538	748524	2082539	748524	No significant change
BZ35-007	2082567	748545	2082562.788	748544.180	Relocated because of utilities
BZ35-008	2082641	748444	2082651	748444	Relocated because of utilities
BZ35-010	2082648	748372	2082642	748372	Relocated because of utilities
BZ34-001	2082652	748337	2082558.477	748334.135	No significant change
BY33-001	2082514	748159	NA	NA	Not taken
BY34-001	2082524	748359	2082524.00	748359.00	No significant change
BY34-002	2082528	748323	2082528.00	748323.00	No significant change
BY34-003	2082532	748288	2082539.00	748279.00	Relocated because of utilities
BY34-004	2082536	748252	2082536.00	748252.00	No significant change
BY34-005	2082507	748231	2082507.00	748232.00	No significant change
BY34-006	2082503	748267	2082508.00	748260.00	Relocated because of utilities
BY34-007	2082495	748338	2082496.00	748326.00	Relocated because of utilities
BY34-008	2082477	748210	2082478.00	748223.00	Relocated because of utilities
BY34-009	2082510	748195	NA	NA	Not taken
BY34-010	2082481	748174	NA	NA	Not taken
BY34-011	2082499	748302	2082499	748302	No significant change
BY35-001	2082520	748395	2082520	748395	No significant change
BY35-002	2082491	748374	2082491	748374	No significant change
BY35-003	2082487	748410	2082487	748410	No significant change
BZ33-001	2082671	748158	NA	NA	Not taken
BZ34-001	NA	NA	2082543	748339	Relocated because of utilities
BZ34-002	2082656	748301	2082656	748302	No significant change
BZ34-003	2082660	748265	2082660	748265	No significant change
BZ34-004	2082663	748229	2082663	748229	No significant change
BZ34-005	2082667	748194	2082634	748205	No significant change
BZ34-006	2082638	748172	2082632	748244	No significant change
BZ34-007	2082634	748208	2082623	748315	No significant change
BZ34-008	2082631	748244	2082619	748351	No significant change
BZ34-009	2082623	748315	2082591	748319	No significant change
BZ34-010	2082619	748351	2082594	748294	No significant change
BZ34-011	2082590	748330	2082598	748259	Relocated because of utilities
BZ34-012	2082594	748294	NA	NA	Not taken
BZ34-013	2082598	748259	NA	NA	Not taken
BZ34-014	2082601	748223	2082605	748227	No significant change
BZ34-015	2082605	748187	NA	NA	Not taken
BZ34-016	2082576	748166	NA	NA	Not taken
BZ34-017	2082572	748202	2082570	748219	Relocated because of utilities
BZ34-018	2082569	748237	2082569	748237	No significant change
BZ34-019	2082565	748273	2082565	748273	No significant change

30

Sampling Location	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Comments
BZ34-020	2082561	748309	2082567	748301	Relocated because of utilities
BZ34-021	2082557	748345	2082559	748334	No significant change
BZ34-022	2082539	748216	2082539	748221	Relocated because of utilities
BZ34-023	2082543	748180	NA	NA	Not taken
BZ35-011	2082615	748387	2082615	748395	Relocated because of utilities
BZ35-012	2082582	748402	2082582	748402	No significant change
BZ35-013	2082553	748380	2082553	748380	No significant change
BZ35-014	2082644	748408	2082640	748395	Relocated because of utilities
BZ35-015	2082586	748366	2082586	748355	Relocated because of utilities
BZ34-034	NA	NA	2082662	748229	Not planned

NA = not applicable

31

4.0 DATA QUALITY ASSESSMENT

The Data Quality Objectives (DQOs) for this project are described in the IASAP (DOE 2002). All DQOs for this project were achieved based on the following:

- Regulatory agency approved sampling program design (IASAP Addendum 02-01 [DOE 2001a);
- Collection of samples in accordance with the sampling design;
- Results of the Data Quality Assessment as described in the following sections.

4.1 Data Quality Assessment Process

The DQA process ensures that the type, quantity and quality of environmental data used in decision making are defensible, and is based on the following guidance and requirements:

- EPA QA/G-4, 1994a, Guidance for the Data Quality Objective Process;
- EPA QA/G-9, 1998, Guidance for the Data Quality Assessment Process; Practical Methods for Data Analysis; and
- DOE Order 414.1A, 1999, Quality Assurance.

Verification and validation (V&V) of the data are the primary components of the DQA. The final data are compared with original project DQOs and evaluated with respect to project decisions; uncertainty within the decisions; and quality criteria required for the data, specifically precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS). Validation criteria are consistent with the following RFETS-specific documents and industry guidelines:

- EPA 540/R-94/012, 1994b, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review;
- EPA 540/R-94/013, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review; and
- Kaiser-Hill Company, L.L.C.(K-H) V&V Guidelines:
  - General Guidelines for Data Verification and Validation, DA-GR01-v2, 2002a.
  - V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v3, 2002b.
  - V&V Guidelines for Volatile Organics, DA-SS01-v3, 2002c.
  - V&V Guidelines for Semivolatile Organics, DA-SS02-v1, 2002d.

32

- V&V Guidelines for Metals, DA-SS05-v1, 2002e.

- Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

This report will be submitted to the Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA) Administrative Record (AR) for permanent storage 30 days after being provided to CDPHE and/or U.S. EPA.

4.2 Verification and Validation of Results

Verification ensures that data produced and used by the project are documented and traceable in accordance with quality requirements. Validation consists of a technical review of all data that directly support the project decisions so that any limitations of the data relative to project goals are delineated and the associated data are qualified accordingly. The V&V process defines the criteria that constitute data quality, namely PARCCS parameters. Data traceability and archival are also addressed. V&V criteria include the following:

- Chain-of-custody;
- Preservation and hold-times;
- Instrument calibrations;
- Preparation blanks;
- Interference check samples (metals);
- Matrix spikes/matrix spike duplicates (MS/MSD);
- Laboratory control samples (LCS);
- Field duplicate measurements;
- Chemical yield (radiochemistry);
- Required quantitation limits/minimum detectable activities (sensitivity of chemical and radiochemical measurements, respectively); and
- Sample analysis and preparation methods.

Evaluation of V&V criteria ensures that PARCCS parameters are satisfactory (i.e., within tolerances acceptable to the project). Satisfactory V&V of laboratory quality controls are captured through application of validation "flags" or qualifiers to individual records.

Raw hardcopy data (e.g., individual analytical data packages) are currently filed by RIN and are maintained by Kaiser-Hill Analytical Services Division; older hardcopies may reside in the Federal Center in Lakewood, Colorado. Electronic data are stored in the RFETS Soil and Water Database.

Both real and QC data, as of June 11, 2003 are included on the enclosed CDs.

4.2.1 Accuracy

The following measures of accuracy were evaluated:

- Laboratory Control Sample Evaluation;
- Surrogate Evaluation;
- Field Blanks; and
- Sample Matrix Spike Evaluation.

Results are compared to method requirements and project goals. The results of these comparisons are summarized for RFCA COCs where the result could impact project decisions. Particular attention is paid to those values near ALs when quality control (QC) results could indicate unacceptable levels of uncertainty for decision-making purposes.

Laboratory Control Sample Evaluation

The frequency of LCS measurements, relative to each laboratory batch, is given in Table 8. LCS frequency was adequate based on at least one LCS per batch. The minimum and maximum LCS results are also tabulated, by chemical, for the entire project. While not all LCS results are within tolerances, project decisions based on AL exceedances were not affected. Any qualifications of results due to LCS performance exceeding upper or lower tolerance limits are captured in the V&V flags, described in the Completeness Section.

Surrogate Evaluation

The frequency of surrogate measurements, relative to each laboratory batch, is given in Table 9. Surrogate frequency was adequate based on at least one set per sample. The minimum and maximum surrogate results are also tabulated, by chemical, for the entire project. Any qualifications of results due to surrogate results are captured in the V&V flags, described in the Completeness Section.

Field Blank Evaluation

Results of the field blank analyses are given in Table 10. Detectable amounts of contaminants within the blanks, which could indicate possible cross-contamination of samples, are evaluated if the same contaminant is detected in the associated real samples. When the real result is less than 10 times the blank result for laboratory contaminants and 5 times the result for non-laboratory contaminants, the real result is eliminated. None of the chemicals detected in blanks were detected at concentrations greater than ALs, therefore no significant blank contamination is indicated. Soil removal decisions were based on plutonium soil activity.

Table 8
Laboratory Control Sample Evaluation

CAS No.	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
71-55-6	1,1,1-Trichloroethane	LC	80	100	6	6	%REC	SW-846 8260
79-34-5	1,1,2,2-Tetrachloroethane	LC	89	109	6	6	%REC	SW-846 8260
79-00-5	1,1,2-Trichloroethane	LC	91	102	6	6	%REC	SW-846 8260
75-34-3	1,1-Dichloroethane	LC	84	104	6	6	%REC	SW-846 8260
75-35-4	1,1-Dichloroethene	LC	87	118	23	23	%REC	SW-846 8260
75-35-4	1,1-Dichloroethene	LC	77	114	7	7	%REC	SW-846 8260
120-82-1	1,2,4-Trichlorobenzene	LC	77	98	6	6	%REC	SW-846 8260
120-82-1	1,2,4-Trichlorobenzene	LC	71	71	1	1	%REC	SW-846 8270B
95-50-1	1,2-Dichlorobenzene	LC	79	94	6	6	%REC	SW-846 8260
107-06-2	1,2-Dichloroethane	LC	86	102	6	6	%REC	SW-846 8260
78-87-5	1,2-Dichloropropane	LC	89	113	6	6	%REC	SW-846 8260
106-46-7	1,4-Dichlorobenzene	LC	79	102	6	6	%REC	SW-846 8260
121-14-2	2,4-Dinitrotoluene	LC	73	73	1	1	%REC	SW-846 8270B
78-93-3	2-Butanone	LC	94	117	6	6	%REC	SW-846 8260
95-57-8	2-Chlorophenol	LC	73	73	1	1	%REC	SW-846 8270B
108-10-1	4-Methyl-2-pentanone	LC	98	121	6	6	%REC	SW-846 8260
83-32-9	Acenonaphthene	LC	74	74	1	1	%REC	SW-846 8270B
67-64-1	Acetone	LC	95	127	6	6	%REC	SW-846 8260
7429-90-5	Aluminum	LC	94.9	105.4	10	10	%REC	EPA 6200
[redacted]90-5	Aluminum	LC	88	98	13	13	%REC	SW-846 6010/6010B
7440-36-0	Antimony	LC	95	105	8	8	%REC	EPA 6200
7440-36-0	Antimony	LC	89	98	13	13	%REC	SW-846 6010/6010B
7440-38-2	Arsenic	LC	98.3	108.2	8	8	%REC	EPA 6200
7440-38-2	Arsenic	LC	92	105	13	13	%REC	SW-846 6010/6010B
7440-39-3	Barium	LC	96	108	8	8	%REC	EPA 6200
7440-39-3	Barium	LC	93	104	13	13	%REC	SW-846 6010/6010B
71-43-2	Benzene	LC	87	115	30	30	%REC	SW-846 8260
7440-41-7	Beryllium	LC	93	107	7	7	%REC	EPA 6200
7440-41-7	Beryllium	LC	90	105	13	13	%REC	SW-846 6010/6010B
75-27-4	Bromodichloromethane	LC	83	98	6	6	%REC	SW-846 8260
75-25-2	Bromoform	LC	92	106	6	6	%REC	SW-846 8260
74-83-9	Bromomethane	LC	73	99	6	6	%REC	SW-846 8260
7440-43-9	Cadmium	LC	93	104.7	8	8	%REC	EPA 6200
7440-43-9	Cadmium	LC	90	100	13	13	%REC	SW-846 6010/6010B
75-15-0	Carbon Disulfide	LC	81	111	6	6	%REC	SW-846 8260
56-23-5	Carbon Tetrachloride	LC	80	102	6	6	%REC	SW-846 8260
108-90-7	Chlorobenzene	LC	88	111	30	30	%REC	SW-846 8260
75-00-3	Chloroethane	LC	87	107	6	6	%REC	SW-846 8260
67-66-3	Chloroform	LC	84	102	6	6	%REC	SW-846 8260
74-87-3	Chloromethane	LC	72	110	6	6	%REC	SW-846 8260
10061-01-5	cis-1,3-Dichloropropene	LC	78	95	6	6	%REC	SW-846 8260
[redacted]48-4	Cobalt	LC	92	104.4	8	8	%REC	EPA 6200

CAS No.	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
7440-48-4	Cobalt	LC	89	102	13	13	%REC	SW-846 6010/6010B
7440-50-8	Copper	LC	97	104.3	8	8	%REC	EPA 6200
7440-50-8	Copper	LC	93	105	13	13	%REC	SW-846 6010/6010B
57-12-5	Cyanide	LC	91.5	102.3	5	5	%REC	E335.3, E335.4, SM4500-CN C,E
57-12-5	Cyanide, Total	LC	88	103	9	9	%REC	E335.3, E335.4, SM4500-CN C,E
124-48-1	Dibromochloromethane	LC	86	98	6	6	%REC	SW-846 8260
100-41-4	Ethylbenzene	LC	87	108	6	6	%REC	SW-846 8260
87-68-3	Hexachlorobutadiene	LC	72	113	6	6	%REC	SW-846 8260
7439-89-6	Iron	LC	92.6	112	8	8	%REC	EPA 6200
7439-89-6	Iron	LC	93	102	13	13	%REC	SW-846 6010/6010B
7439-92-1	Lead	LC	95	113	8	8	%REC	EPA 6200
7439-92-1	Lead	LC	91	101	13	13	%REC	SW-846 6010/6010B
7439-93-2	Lithium	LC	96	111.3	8	8	%REC	EPA 6200
7439-93-2	Lithium	LC	89	101	13	13	%REC	SW-846 6010/6010B
7439-96-5	Manganese	LC	95	105.8	8	8	%REC	EPA 6200
7439-96-5	Manganese	LC	92	105	13	13	%REC	SW-846 6010/6010B
7439-97-6	Mercury	LC	100	107.2	8	8	%REC	EPA 6200
7439-97-6	Mercury	LC	98	102	9	9	%REC	SW-846 6010/6010B
75-09-2	Methylene Chloride	LC	79	102	6	6	%REC	SW-846 8260
[redacted]-98-7	Molybdenum	LC	93	110	8	8	%REC	EPA 6200
[redacted]-98-7	Molybdenum	LC	88	98	13	13	%REC	SW-846 6010/6010B
91-20-3	Naphthalene	LC	80	103	6	6	%REC	SW-846 8260
7440-02-0	Nickel	LC	94	110	8	8	%REC	EPA 6200
7440-02-0	Nickel	LC	90	100	13	13	%REC	SW-846 6010/6010B
621-64-7	N-Nitroso-Di-N-Propylamine	LC	74	74	1	1	%REC	SW-846 8270B
106-46-7	P-Dichlorobenzene	LC	69	69	1	1	%REC	SW-846 8270B
87-86-5	Pentachlorophenol	LC	66	66	1	1	%REC	SW-846 8270B
108-95-2	Phenol	LC	74	74	1	1	%REC	SW-846 8270B
100-02-7	P-Nitrophenol	LC	68	68	1	1	%REC	SW-846 8270B
129-00-0	Pyrene	LC	71	71	1	1	%REC	SW-846 8270B
7782-49-2	Selenium	LC	101	110.8	8	8	%REC	EPA 6200
7782-49-2	Selenium	LC	90	103	13	13	%REC	SW-846 6010/6010B
7440-22-4	Silver	LC	95	111	8	8	%REC	EPA 6200
7440-22-4	Silver	LC	88	104	13	13	%REC	SW-846 6010/6010B
7440-24-6	Strontium	LC	95	105.2	8	8	%REC	EPA 6200
7440-24-6	Strontium	LC	91	99	13	13	%REC	SW-846 6010/6010B
100-42-5	Styrene	LC	90	112	6	6	%REC	SW-846 8260
127-18-4	Tetrachloroethene	LC	82	107	6	6	%REC	SW-846 8260
7440-31-5	Tin	LC	95	111	8	8	%REC	EPA 6200
7440-31-5	Tin	LC	89	101	13	13	%REC	SW-846 6010/6010B
108-88-3	Toluene	LC	83	114	30	30	%REC	SW-846 8260
[redacted]-02-6	trans-1,3-Dichloropropene	LC	89	106	6	6	%REC	SW-846 8260

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CAS No.	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
79-01-6	Trichloroethene	LC	81	112	30	30	%REC	SW-846 8260
7440-61-1	Uranium-238	LC	104	104	1	1	%REC	ALPHA SPEC
7440-62-2	Vanadium	LC	95	106	11	11	%REC	EPA 6200
7440-62-2	Vanadium	LC	93	103	13	13	%REC	SW-846 6010/6010B
75-01-4	Vinyl chloride	LC	89	111	6	6	%REC	SW-846 8260
1330-20-7	Xylene (total)	LC	86	108	6	6	%REC	SW-846 8260
7440-66-6	Zinc	LC	86.6	106.9	8	8	%REC	EPA 6200
7440-66-6	Zinc	LC	89	102	13	13	%REC	SW-846 6010/6010B

Table 9
Surrogate Recovery Summary

VOC Surrogate Recoveries				
Number of Samples	Analyte	Minimum	Maximum	Unit Code
110	1,2-DICHLOROETHANE-D4	26.545	122	%REC
104	4-BROMOFLUOROBENZENE	19.983	107	%REC
109	TOLUENE-D8	23.032	113	%REC
SVOC Surrogate Recoveries				
Number of Samples	Analyte	Minimum	Maximum	Unit Code
8	TERPHENYL-D14	59	77	%REC
8	2-FLUOROBIPHENYL	58	74	%REC
8	2-FLUOROPHENOL	60	76	%REC
8	NITROBENZENE-D5	65	82	%REC

Table 10
Field Blank Summary

Sample QC Code	Test Method Name	Analyte	Maximum Detected Value	Unit
RB	ALPHA SPEC	Uranium-234	0.0339	pCi/g
Field Blanks (Trip, Rinse, Field) results greater than detection limits (not *U* Qualified)				

Sample Matrix Spike Evaluation

The frequency of MS measurements, relative to each laboratory batch, was adequate based on at least one MS per batch. The minimum and maximum of MS results are summarized by chemical, for the entire project in Table 11. MS recoveries alone do not result in rejection of data; any qualifications due to matrix spike performance are included in the validation flags summarized in the Completeness Section.

Table 11
Sample Matrix Spike Evaluation

CAS No.	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
75-35-4	1,1-DICHLOROETHENE	MS	66	97	10	10	%REC	SW-846 8260
75-35-4	1,1-DICHLOROETHYLENE	MS	62.1	62.1	1	1	%REC	SW-846 8260 LOW LEVEL
120-82-1	1,2,4-TRICHLOROBENZENE	MS	60	60	1	1	%REC	SW-846 8270B
121-14-2	2,4-DINITROTOLUENE	MS	63	63	1	1	%REC	SW-846 8270B
95-57-8	2-CHLOROPHENOL	MS	68	68	1	1	%REC	SW-846 8270B
83-32-9	ACENAPHTHENE	MS	67	67	1	1	%REC	SW-846 8270B
7429-90-5	ALUMINUM	MS	96	957	12	12	%REC	SW-846 6010/6010B
7440-36-0	ANTIMONY	MS	26	94	12	12	%REC	SW-846 6010/6010B
7440-38-2	ARSENIC	MS	88	103	12	12	%REC	SW-846 6010/6010B
7440-39-3	BARIUM	MS	87	113	12	12	%REC	SW-846 6010/6010B
71-43-2	BENZENE	MS	58	100	10	10	%REC	SW-846 8260
71-43-2	BENZENE	MS	86.9	86.9	1	1	%REC	SW-846 8260 LOW LEVEL
7440-41-7	BERYLLIUM	MS	88	114	12	12	%REC	SW-846 6010/6010B
7440-43-9	CADMIUM	MS	77	95	12	12	%REC	SW-846 6010/6010B
108-90-7	CHLOROBENZENE	MS	26	98	10	10	%REC	SW-846 8260
108-90-7	CHLOROBENZENE	MS	111	111	1	1	%REC	SW-846 8260 LOW LEVEL
67-66-3	CHLOROFORM	MS	107	107	1	1	%REC	SW-846 8260 LOW LEVEL
7440-48-4	COBALT	MS	87	97	12	12	%REC	SW-846 6010/6010B
7440-50-8	COPPER	MS	92	116	12	12	%REC	SW-846 6010/6010B
57-12-5	CYANIDE, TOTAL	MS	94	94	1	1	%REC	E335.3, E335.4, SM4500-CN C,E
57-12-5	CYANIDE, TOTAL	MS	91	99	4	4	%REC	EPA 335.3
7439-89-6	IRON	MS	98	897	10	10	%REC	SW-846 6010/6010B
7439-92-1	LEAD	MS	76	100	12	12	%REC	SW-846 6010/6010B
7439-93-2	LITHIUM	MS	92	125	12	12	%REC	SW-846 6010/6010B
7439-96-5	MANGANESE	MS	46	398	11	11	%REC	SW-846 6010/6010B
7439-97-6	MERCURY	MS	94	94	1	1	%REC	EPA 600
7439-97-6	MERCURY	MS	78	136	9	9	%REC	SW-846 6010/6010B
7439-98-7	MOLYBDENUM	MS	77	98	12	12	%REC	SW-846 6010/6010B
7440-02-0	NICKEL	MS	91	116	12	12	%REC	SW-846 6010/6010B
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	MS	70	70	1	1	%REC	SW-846 8270B
106-46-7	P-DICHLOROBENZENE	MS	58	58	1	1	%REC	SW-846 8270B
87-86-5	PENTACHLOROPHENOL	MS	46	46	1	1	%REC	SW-846 8270B
108-95-2	PHENOL	MS	70	70	1	1	%REC	SW-846 8270B
100-02-7	P-NITROPHENOL	MS	57	57	1	1	%REC	SW-846 8270B
129-00-0	PYRENE	MS	64	64	1	1	%REC	SW-846 8270B
7782-49-2	SELENIUM	MS	85	99	12	12	%REC	SW-846 6010/6010B
7440-22-4	SILVER	MS	83	105	12	12	%REC	SW-846 6010/6010B
7440-24-6	STRONTIUM	MS	89	120	12	12	%REC	SW-846 6010/6010B
7440-31-5	TIN	MS	82	99	12	12	%REC	SW-846 6010/6010B
108-88-3	TOLUENE	MS	46	102	10	10	%REC	SW-846 8260
108-88-3	TOLUENE	MS	101	101	1	1	%REC	SW-846 8260 LOW LEVEL
79-01-6	TRICHLOROETHENE	MS	57	98	10	10	%REC	SW-846 8260
79-01-6	TRICHLOROETHYLENE	MS	96.8	96.8	1	1	%REC	SW-846 8260 LOW LEVEL

CAS No.	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
7440-62-2	VANADIUM	MS	94	147	12	12	%REC	SW-846 6010/6010B
7440-66-6	ZINC	MS	72	117	12	12	%REC	SW-846 6010/6010B

4.2.2 Precision

Matrix Spike Duplicate Evaluation

Laboratory precision is measured through use of MSD. The frequency of MSD measurements was adequate based on at least one MS per batch as shown in Table 12. Relative percent differences (RPDs) exceeding 35 percent do not affect project decisions because all real sample results (Table 13) were repeatable below ALs.

Table 12
Sample Matrix Spike Duplicate Evaluation

Analyte Name	Number of Sample Pairs	Number of Laboratory Batches	Max RPD (%)
1,1-DICHLOROETHENE	10	10	11
1,1-DICHLOROETHYLENE	1	1	4
1,2,4-TRICHLOROBENZENE	1	1	6
2,4-DINITROTOLUENE	1	1	9
2-CHLOROPHENOL	1	1	7
ACENAPHTHENE	1	1	6
ALUMINUM	12	12	187
ANTIMONY	12	12	38
ARSENIC	12	12	5
BARIUM	12	12	34
BENZENE	1	1	2
BENZENE	10	10	15
BERYLLIUM	12	12	7
CADMIUM	12	12	5
CHLOROBENZENE	1	1	2
CHLOROBENZENE	10	10	14
CHLOROFORM	1	1	2
COBALT	12	12	22
COPPER	12	12	30
CYANIDE, TOTAL	1	1	6
IRON	8	8	153
LEAD	12	12	12
LITHIUM	12	12	12
MANGANESE	11	11	70
MERCURY	9	9	42
MERCURY	1	1	3
MOLYBDENUM	12	12	12
NICKEL	12	12	35

Analyte Name	Number of Sample Pairs	Number of Laboratory Batches	Max RPD (%)
N-NITROSO-DI-N-PROPYLAMINE	1	1	6
P-DICHLOROBENZENE	1	1	13
PENTACHLOROPHENOL	1	1	6
PHENOL	1	1	8
P-NITROPHENOL	1	1	12
PYRENE	1	1	6
SELENIUM	12	12	6
SILVER	12	12	5
STRONTIUM	12	12	12
TIN	12	12	8
TOLUENE	10	10	11
TOLUENE	1	1	3
TRICHLOROETHENE	10	10	12
TRICHLOROETHYLENE	1	1	3
VANADIUM	12	12	29
ZINC	12	12	24

Field Duplicate Evaluation

Field duplicate results reflect sampling precision, or overall repeatability of the sampling process. The frequency of field duplicate collection should exceed 1 field duplicate per 20 real samples, or 5 percent. Table 13 indicates that duplicate sampling frequencies were adequate except for VOCs. Because all VOC sample results were repeatable at concentrations below their respective action levels, the deficiency in VOC duplicate samples is not significant, and does not affect project decisions.

A common metric for evaluating precision is the RPD value; RPD values are given in Table 14. Ideally, RPDs of less than 35 percent (in soil) indicate satisfactory precision. Values exceeding 35 percent only affect project decisions if the imprecision is great enough to cause contradictory decisions relative to the COC (i.e., one sample indicates clean soil whereas the QC partner does not). As indicated by the data in Table 14, a number of analytes, generally VOCs and SVOCs, have RPDs greater than 35 percent. However, none of these analytes were at concentrations greater than ALs and therefore project decisions were not affected.

Table 13
Field Duplicate Sample Frequency

Test Method Name	Sample Code	Number of Samples	% Duplicate Samples
GAMMA SPECTROSCOPY	REAL	41	50
GAMMA SPECTROSCOPY	DUP	2	
SW-846 6010/6010B	REAL	47	6
SW-846 6010/6010B	DUP	3	

40

SW-846 8260	REAL	37	3
SW-846 8260	DUP	1	
SW-846 8270B	REAL	7	14
SW-846 8270B	DUP	1	

Table 14
Field Duplicate Evaluation

Analyte	Max of RPD %
1,1,1-TRICHLOROETHANE	2
1,1,2,2-TETRACHLOROETHANE	2
1,1,2-TRICHLOROETHANE	2
1,1-DICHLOROETHANE	2
1,1-DICHLOROETHENE	2
1,2,4-TRICHLOROBENZENE	3
1,2-DICHLOROETHANE	2
1,2-DICHLOROPROPANE	2
2,4,5-TRICHLOROPHENOL	3
2,4,6-TRICHLOROPHENOL	3
2,4-DICHLOROPHENOL	3
2,4-DIMETHYLPHENOL	3
2,4-DINITROPHENOL	0
2,4-DINITROTOLUENE	3
2,6-DINITROTOLUENE	3
2-BUTANONE	0
2-CHLORONAPHTHALENE	3
2-CHLOROPHENOL	3
2-NITROANILINE	0
4-CHLOROANILINE	3
4-METHYL-2-PENTANONE	0
ACENAPHTHENE	3
ACETONE	20
ALUMINUM	27
ANTHRACENE	3
ANTIMONY	55
ARSENIC	67
BARIUM	60
BENZENE	2
BENZO(A)ANTHRACENE	3
BENZO(A)PYRENE	3
BENZO(B)FLUORANTHENE	3
BENZO(K)FLUORANTHENE	3
BENZOIC ACID	0
BERYLLIUM	27
BIS(2-ETHYLHEXYL)PHTHALATE	3
BROMODICHLOROMETHANE	2
BROMOFORM	2

BROMOMETHANE	2
BUTYLBENZYLPHTHALATE	3
CARBON DISULFIDE	2
CARBON TETRACHLORIDE	2
CHLOROBENZENE	2
CHLOROETHANE	2
CHLOROFORM	2
CHLOROMETHANE	2
CHRYSENE	3
CIS-1,3-DICHLOROPROPENE	2
COBALT	110
COPPER	30
DIBENZ(A,H)ANTHRACENE	3
ISOPHORONE	3
LEAD	197
LITHIUM	30
MANGANESE	98
MERCURY	164
METHYLENE CHLORIDE	17
MOLYBDENUM	139
NAPHTHALENE	3
NICKEL	125
NITROBENZENE	3
IRON	21
N-NITROSODIPHENYLAMINE	3
PENTACHLOROPHENOL	0
PHENOL	3
PYRENE	3
SELENIUM	16
SILVER	11
STRONTIUM	52
TETRACHLOROETHENE	2
TIN	13
TOLUENE	2
TRANS-1,3-DICHLOROPROPENE	2
TRICHLOROETHENE	2
VANADIUM	37
VINYL CHLORIDE	2
ZINC	22

Completeness

Based on original project DQOs, a minimum of 25 percent of ER Program analytical (and radiological) results must be formally verified and validated. Of that percentage, no more than 10 percent of the results may be rejected, which ensures that analytical laboratory practices are consistent with quality requirements. Table 15 shows the number of validated records (codes without "1"), verified records (codes with "1"), and rejected records for each analytical group.

42

Validation frequency goals were attained for all groups except radionuclides and <1% of the data were rejected for each group. Validation frequency of radionuclides via alpha spectroscopy is better than 25 percent for the ER Program as a whole (approximately 52 percent. Checks on flags applied to radionuclide gamma spectroscopy results in hardcopy data packages indicate at least a 25 percent validation frequency. Those flags have not yet been uploaded to the digital records in the RFETS Soil Water Database (SWD). As a result, the percentages of validation appear low in Table 15. As additional V&V information is received, IHSS Group 400-10 records will be updated in SWD. Data qualified as a result of additional data qualification will be assessed as part of the Comprehensive Risk Assessment process. In summary, validation frequencies and results were satisfactory for all analytical groups.

Less than 1% of the data were rejected. Because the frequency of validation is within program quality requirements of RFETS validation goal of 25 percent of all analytical records the results indicate that these data are adequate.

4.2.3 Sensitivity

Reporting limits, in units of ug/kg for organics, mg/kg for metals, and pCi/g for radionuclides, were compared with proposed RFCA WRW and Ecological Receptor ALs. Adequate sensitivities of analytical methods were attained for all COCs that affect project decisions. "Adequate" sensitivity is defined as a reporting limit less than an analyte's associated AL, typically less than one-half the AL.

4.3 Summary of Data Quality

The RPDs greater than 35 percent indicate that the sampling precision limits some analytes has been exceeded. However, the imprecision does not affect project decisions. Less than 1 percent of the records were rejected. Compliance with the program quality requirements and the RFETS validation goal of 25 percent of all program analytical records indicates that the unvalidated data are adequate for project decisions. If additional V&V information is received, IHSS Group 400-10 records will be updated in the Soil Water Database. Data qualified as a result of additional data qualification will be assessed as part of the Comprehensive Risk Assessment process. Data collected and used for IHSS Group 400-10 is adequate for decision-making.

Table 15
Validation and Verification Summary

Validation Code	Number of Records	Radionuclides	Metals	SVOCs	VOCs
No V&V	1030	1025	0	0	5
J	870	0	867	0	3
J1	48	0	48	0	0
R	30	0	30	0	0
V	6896	0	1183	474	5239
V1	72	0	72	0	0
JB	46	0	0	0	46
UJ	353	0	152	0	201
UJ1	4	0	4	0	0
Total	9349	1025	2356	474	5494
Total Validated	7842	0	2080	474	5288
% Validated	84%	0%	88%	100%	96%
Total Verified	8319	0	2356	474	5489
% Verified	89%	0%	100%	100%	100%
% Rejected	0.32%	0.00%	1.27%	0.00%	0.00%

KEY:

1, V1 - Verified
J, J1 - Estimated
UJ, UJ1 - Estimated detection limit
V - Validated
R - Rejected

5.0 REFERENCES

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EPA QA/G-9, 1998, Guidance for the Data Quality Assessment Process; Practical Methods for Data Analysis.

Kaiser-Hill (K-H), 2002a, General Guidelines for Data Verification and Validation, DA-GR01-v2, October.

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K-H, 2002c, V&V Guidelines for Semivolatile Organics, DA-SS02-v3, October.

K-H, 2002d V&V Guidelines for Metals, DA-SS05-v3, October.

K-H, 2002e, V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v2, October.

Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

CORRES. CONTROL
OUTGOING LTR NO.

DOE ORDER #

03RF00931

DIST.	LTR	ENC
Berardini, Jacqueline	X	
BRAILSFORD, M.D.		
FERRERA, D.W.	X	
FERRI, M.S.		
FULTON, J.C.		
GIACOMINI, J.		
HALL, L.		
MARTINEZ, L.A.		
PARKER, A.M.		
POWERS, K.		
SCOTT, G.K.		
SHELTON, D.C.	X	
SPEARS, M.S.		
TRICE, K.D.		
VOORHEIS, G.M.		
BUTLER, J.L.	X	X
BROUSSARD, M	X	
COR. CONTROL	X	X
ADMN. RECORD	X	X
WASTE REC. CTR.		
TRAFFIC		
PATS/130		
CLASSIFICATION:		
UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE
Exemption – CEX-105-01

Date

IN REPLY TO RFP CC NO:

ACTION ITEM STATUS

☐ PARTIAL/OPEN

☐ CLOSED

LTR APPROVALS:

ORIG & TYPIST INITIALS

KAISER•HILL COMPANY

03 JUN 19 AM 9:1

CCDM

June 19, 2003

03-RF-00931

Mr. Richard DiSalvo
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TRANSMITTAL OF THE FINAL DATA SUMMARY REPORT FOR IHSS GROUP 900-4&5 JLB-058-03

Enclosed are copies of the Final Data Summary Report for IHSS Group 900-4&5 for your verification and subsequent approval. Previous comments have been incorporated as discussed. DOE will request formal approval from your staff upon completion of their verification.

If you have any questions, please contact me at extension 5245.

Kathleen A Wiemelt FOR
J. Lane Butler
Manager, Environmental Restoration Programs

JLB:kg

Orig. and 1 cc – Richard DiSalvo
cc: Norma Castaneda

Enclosures:
As Stated

Kaiser-Hill Company, L L C
Rocky Flats Environmental Technology Site, 10808 Hwy. 93 Unit B, Golden, CO 80403-8200 ♦ 303-966-7000

47

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Data Summary Report
IHSS Group 900-4&5

June 2003

48

Data Summary Report
IHSS Group 900-4&5

Approval received from the Colorado Department of Public Health and Environment.

( )

Approval letter contained in the Administrative Record.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDIX

Enclosures

50

ACRONYMS AND ABBREVIATIONS

AL	action level
AR	Administrative Record
CD	compact disk
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
DOE	U.S. Department of Energy
DQA	Data Quality Assessment
DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
HPGe	high purity germanium detector
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
K-H	Kaiser-Hill Company L.L.C.
LCS	laboratory control sample
mg/kg	milligram per kilogram
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
ND	not detected
NFA	No Further Action
NFAA	No Further Accelerated Action
PAC	Potential Area of Concern
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
pCi/g	picocurie per gram
POC	Point of Compliance
QA	quality assurance
QC	quality control
REC	percent recovered
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RIN	report identification number
RPD	relative percent difference
SD	standard deviation
SVOC	semi-volatile organic compound
SWD	Soil Water Database
µg/kg	microgram per kilogram
µg/L	microgram per liter
V&V	verification and validation
WRW	Wildlife Refuge Worker

51

1.0 INTRODUCTION

This data summary report summarizes characterization activities conducted at Individual Hazardous Substance Site (IHSS) Group 900-4&5 at the Rocky Flats Environmental Technology Site (RFETS) in Golden, Colorado. Characterization activities were planned and executed in accordance with the Industrial Area Sampling and Analysis Plan (IASAP) (DOE 2001) and IASAP Addendum #IA-02-02 (DOE 2002a).

IHSS Group 900-4&5 consists of Potential Area of Concern (PAC) 900-175, S&W Building 980 Contractor Storage Facility and PAC-1308, Gasoline Spill Outside of Building 980. PAC-1308 received a No Further Action (NFA) determination on February 14, 2002 and is consequently not included in this report. The location of PAC 900-175 is shown on Figure 1.

2.0 SITE CHARACTERIZATION

IHSS Group 900-4&5 information consists of historical knowledge (DOE 1992-2001), previous sampling data from nine sampling locations (DOE 2002a), and six additional sampling locations with specifications as described in IASAP Addendum #IA-02-02 (DOE 2002a). The sampling specifications for the most recent characterization samples collected are listed in Table 1. The location of these samples and analytical results greater than background mean plus two standard deviations or detection/reporting limits are presented in Figure 2 and Table 2. A summary of the analytical results is presented in Table 3. Deviations from planned sampling specifications are presented in Table 4. A summary of validated analytical records is presented in Table 5. The raw data are presented as Appendix A.

Analytical results from the previous and the most recent sampling events indicate that all contaminant concentrations are less than Rocky Flats Cleanup Agreement (RFCA) Tier II action levels (ALs) and the RFCA Wildlife Refuge Worker (WRW) ALs. A comparison of the most recent analytical results to the RFCA WRW ALs is presented in Appendix B.

All analytical results indicate that No Further Accelerated Action (NFAA) for IHSS Group 900-4&5 is warranted for the following reasons:

- All contaminant concentrations are less than WRW ALs.
- All contaminant concentrations are less than Site Ecological Receptor ALs.
- There is no identified potential to exceed surface water standards at a Point of Compliance (POC) from this IHSS Group.

A subsurface soil risk screen is not required because these IHSSs were the result of surface soil spills and subsurface soil was not evaluated.

Approval of this Data Summary Report constitutes regulatory agency concurrence of this IHSS Group as an NFAA. This information and NFAA determination will be documented in the FY03 Historical Release Report (HRR).

52

Table 1
PAC 900-175 –Characterization Sampling Specifications

IHSS Group	IHSS/PAC/UBC Site	Location Code	Easting	Northing	Media	Depth Interval	Analyte	Laboratory Method
900-4&5	PAC 900-175, S&W Building 980 Contractor Storage Facility	CL43-0002	2084965.91	750060.59	surface soil	A	metals radionuclides SVOCs nitrite/nitrate	6010 HPGe 8270 9056
		CK43-0002	2084929.95	750062.37	surface soil	A	metals radionuclides SVOCs nitrite/nitrate	6010 HPGe 8270 9056
		CK43-0001	2084894	750064.16	surface soil	A	metals radionuclides SVOCs nitrite/nitrate	6010 HPGe 8270 9056
		CL43-0001	2084985.43	750090.83	surface soil	A	metals radionuclides SVOCs nitrite/nitrate	6010 HPGe 8270 9056
		CL43-0000	2084949.48	750092.62	surface soil	A	metals radionuclides SVOCs nitrite/nitrate	6010 HPGe 8270 9056
		CK43-0000	2084913.52	750094.40	surface soil	A	metals radionuclides SVOCs nitrite/nitrate	6010 HPGe 8270 9056

Table 2
PAC 900-175 – Surface Soil Greater than Background Mean Plus Two Standard Deviations or Reporting Limits

IHSS/PAC/UBC Site	Location Code	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Reporting Limit	Tier I Action Level	Tier II Action Level	Background Mean +2SD	Unit
900-175	CK43-000	2084949.95	750075.39	Benzo(a)anthracene	0	0.5	100	40	614000	6140	NA	ug/kg
900-175	CK43-000	2084949.95	750075.39	Benzo(a)pyrene	0	0.5	140	97	61400	614	NA	ug/kg
900-175	CK43-000	2084949.95	750075.39	Benzo(b)fluoranthene	0	0.5	130	100	614000	6140	NA	ug/kg
900-175	CK43-000	2084949.95	750075.39	Benzo(k)Fluoranthene	0	0.5	150	96	6140000	61400	NA	ug/kg
900-175	CK43-000	2084949.95	750075.39	Bis(2-ethylhexyl)phthalate	0	0.5	82	71	32000000	320000	NA	ug/kg
900-175	CK43-000	2084949.95	750075.39	Chromium	0	0.5	106	0.36	44300	4410	16.99	mg/kg
900-175	CK43-000	2084949.95	750075.39	Chrysene	0	0.5	150	55	61400000	614000	NA	ug/kg
900-175	CK43-000	2084949.95	750075.39	Copper	0	0.5	31.9	0.19	71100	71100	18.06	mg/kg
900-175	CK43-000	2084949.95	750075.39	Fluoranthene	0	0.5	330	87	76800000	76800000	NA	ug/kg
900-175	CK43-000	2084949.95	750075.39	Indeno(1,2,3-cd)pyrene	0	0.5	73	49	614000	6140	NA	ug/kg
900-175	CK43-000	2084949.95	750075.39	Nickel	0	0.5	67.9	0.44	38400	38400	14.91	mg/kg
900-175	CK43-000	2084949.95	750075.39	Pyrene	0	0.5	290	41	57600000	57600000	NA	ug/kg
900-175	CK43-000	2084949.95	750075.39	Zinc	0	0.5	171	0.59	576000	576000	73.76	mg/kg
900-175	CK43-001	2084913.40	750094.41	Benzo(a)anthracene	0	0.5	180	41	614000	6140	NA	ug/kg
900-175	CK43-001	2084913.40	750094.41	Benzo(a)pyrene	0	0.5	230	99	61400	614	NA	ug/kg
900-175	CK43-001	2084913.40	750094.41	Benzo(b)fluoranthene	0	0.5	240	110	614000	6140	NA	ug/kg
900-175	CK43-001	2084913.40	750094.41	Benzo(k)Fluoranthene	0	0.5	230	98	6140000	61400	NA	ug/kg
900-175	CK43-001	2084913.40	750094.41	Bis(2-ethylhexyl)phthalate	0	0.5	75	73	32000000	320000	NA	ug/kg
900-175	CK43-001	2084913.40	750094.41	Chromium	0	0.5	40.3	0.35	44300	4410	16.99	mg/kg
900-175	CK43-001	2084913.40	750094.41	Chrysene	0	0.5	260	56	61400000	614000	NA	ug/kg
900-175	CK43-001	2084913.40	750094.41	Copper	0	0.5	28.1	0.18	71100	71100	18.06	mg/kg
900-175	CK43-001	2084913.40	750094.41	Dimethly phthalate	0	0.5	110	89	1000000000	1000000000	NA	ug/kg
900-175	CK43-001	2084913.40	750094.41	Fluoranthene	0	0.5	550	88	76800000	76800000	NA	ug/kg
900-175	CK43-001	2084913.40	750094.41	Indeno(1,2,3-cd)pyrene	0	0.5	150	50	614000	6140	NA	ug/kg
900-175	CK43-001	2084913.40	750094.41	Nickel	0	0.5	30.5	0.43	38400	38400	14.91	mg/kg
900-175	CK43-001	2084913.40	750094.41	Pyrene	0	0.5	470	42	57600000	57600000	NA	ug/kg

IHSS/PAC/UBC Site	Location Code	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Reporting Limit	Tier I Action Level	Tier II Action Level	Background Mean +2SD	Unit
900-175	CK43-001	2084913.40	750094.41	Zinc	0	0.5	96.9	0.57	576000	576000	73.76	mg/kg
900-175	CK43-002	2084894.08	750064.21	Benzo(a)anthracene	0	0.5	210	40	614000	6140	NA	ug/kg
900-175	CK43-002	2084894.08	750064.21	Benzo(a)pyrene	0	0.5	240	96	61400	614	NA	ug/kg
900-175	CK43-002	2084894.08	750064.21	Benzo(b)fluoranthene	0	0.5	230	100	614000	6140	NA	ug/kg
900-175	CK43-002	2084894.08	750064.21	Benzo (K) Fluoranthene	0	0.5	240	95	6140000	61400	NA	ug/kg
900-175	CK43-002	2084894.08	750064.21	Bis(2-ethylhexyl)phthalate	0	0.5	310	70	32000000	320000	NA	ug/kg
900-175	CK43-002	2084894.08	750064.21	Chromium	0	0.5	102	0.36	44300	4410	16.99	mg/kg
900-175	CK43-002	2084894.08	750064.21	Chrysene	0	0.5	260	54	61400000	614000	NA	ug/kg
900-175	CK43-002	2084894.08	750064.21	Copper	0	0.5	74.4	0.18	71100	71100	18.06	mg/kg
900-175	CK43-002	2084894.08	750064.21	Dibenz(a,h)anthracene	0	0.5	64	48	61400	614	NA	ug/kg
900-175	CK43-002	2084894.08	750064.21	Dimethly phthalate	0	0.5	320	86	1000000000	1000000000	NA	ug/kg
900-175	CK43-002	2084894.08	750064.21	Fluoranthene	0	0.5	540	85	76800000	76800000	NA	ug/kg
900-175	CK43-002	2084894.08	750064.21	Indeno(1,2,3-cd)pyrene	0	0.5	160	49	614000	6140	NA	ug/kg
900-175	CK43-002	2084894.08	750064.21	Nickel	0	0.5	69.3	0.44	38400	38400	14.91	mg/kg
900-175	CK43-002	2084894.078	750064.21	Pyrene	0	0.5	500	41	57600000	57600000	NA	ug/kg
900-175	CK43-002	2084894.078	750064.21	Zinc	0	0.5	172	0.58	576000	576000	73.76	mg/kg
900-175	CL43-000	2084913.25	750078.42	Benzo(a)anthracene	0	0.5	44	40	614000	6140	NA	ug/kg
900-175	CL43-000	2084913.25	750078.42	Bis(2-ethylhexyl)phthalate	0	0.5	9700	140	32000000	320000	NA	ug/kg
900-175	CL43-000	2084913.25	750078.42	Chromium	0	0.5	34.4	0.35	44300	4410	16.99	mg/kg
900-175	CL43-000	2084913.25	750078.42	Chrysene	0	0.5	58	54	61400000	614000	NA	ug/kg
900-175	CL43-000	2084913.25	750078.42	Copper	0	0.5	19.5	0.18	71100	71100	18.06	mg/kg
900-175	CL43-000	2084913.25	750078.42	Fluoranthene	0	0.5	120	86	76800000	76800000	NA	ug/kg
900-175	CL43-000	2084913.25	750078.42	Nickel	0	0.5	20.2	0.43	38400	38400	14.91	mg/kg
900-175	CL43-000	2084913.25	750078.42	Pyrene	0	0.5	100	41	57600000	57600000	NA	ug/kg
900-175	CL43-000	2084913.25	750078.42	Pyrene	0	0.5	100	82	57600000	57600000	NA	ug/kg
900-175	CL43-000	2084913.25	750078.42	Zinc	0	0.5	80.6	0.57	576000	576000	73.76	mg/kg
900-175	CL43-001	2084949.49	750092.67	Benzo(a)anthracene	0	0.5	310	39	614000	6140	NA	ug/kg
900-175	CL43-001	2084949.49	750092.67	Benzo(a)pyrene	0	0.5	270	95	61400	614	NA	ug/kg
900-175	CL43-001	2084949.49	750092.67	Benzo(b)fluoranthene	0	0.5	240	100	614000	6140	NA	ug/kg
900-175	CL43-001	2084949.49	750092.67	Benzo (K) Fluoranthene	0	0.5	290	94	6140000	61400	NA	ug/kg

IHSS/PAC/UBC Site	Location Code	Easting	Northing	Analyte	Depth Start (feet)	Depth End (feet)	Result	Reporting Limit	Tier I Action Level	Tier II Action Level	Background Mean +2SD	Unit
900-175	CL43-001	2084949.48	750092.62	Bis(2-ethylhexyl)phthalate	0	0.5	100	70	32000000	320000	NA	ug/kg
900-175	CL43-001	2084949.48	750092.62	Chromium	0	0.5	114	0.35	44300	4410	16.99	mg/kg
900-175	CL43-001	2084949.48	750092.62	Chrysene	0	0.5	390	54	61400000	614000	NA	ug/kg
900-175	CL43-001	2084949.48	750092.62	Copper	0	0.5	36.6	0.18	71100	71100	18.06	mg/kg
900-175	CL43-001	2084949.48	750092.62	Fluoranthene	0	0.5	690	85	76800000	76800000	NA	ug/kg
900-175	CL43-001	2084949.48	750092.62	Indeno(1,2,3-cd)pyrene	0	0.5	150	49	614000	6140	NA	ug/kg
900-175	CL43-001	2084949.48	750092.62	Iron	0	0.5	18900	1.6	576000	576000	18037	mg/kg
900-175	CL43-001	2084949.48	750092.62	Lithium	0	0.5	11.6	0.24	38400	38400	11.55	mg/kg
900-175	CL43-001	2084949.48	750092.62	Nickel	0	0.5	69.7	0.43	38400	38400	14.91	mg/kg
900-175	CL43-001	2084949.48	750092.62	Pyrene	0	0.5	690	40	57600000	57600000	NA	ug/kg
900-175	CL43-001	2084949.48	750092.62	Zinc	0	0.5	80.5	0.58	576000	576000	73.76	mg/kg
900-175	CL43-002	2084985.46	750090.89	Benzo(a)anthracene	0	0.5	160	41	614000	6140	NA	ug/kg
900-175	CL43-002	2084985.46	750090.89	Benzo(a)pyrene	0	0.5	190	98	61400	614	NA	ug/kg
900-175	CL43-002	2084985.46	750090.89	Benzo(b)fluoranthene	0	0.5	170	100	614000	6140	NA	ug/kg
900-175	CL43-002	2084985.46	750090.89	Benzo (K) Fluoranthene	0	0.5	200	97	6140000	61400	NA	ug/kg
900-175	CL43-002	2084985.46	750090.89	Bis(2-ethylhexyl)phthalate	0	0.5	1600	71	32000000	320000	NA	ug/kg
900-175	CL43-002	2084985.46	750090.89	Chromium	0	0.5	28.2	0.36	44300	4410	16.99	mg/kg
900-175	CL43-002	2084985.46	750090.89	Chrysene	0	0.5	210	55	61400000	614000	NA	ug/kg
900-175	CL43-002	2084985.46	750090.89	Copper	0	0.5	31.5	0.19	71100	71100	18.06	mg/kg
900-175	CL43-002	2084985.46	750090.89	Fluoranthene	0	0.5	440	87	76800000	76800000	NA	ug/kg
900-175	CL43-002	2084985.46	750090.89	Indeno(1,2,3-cd)pyrene	0	0.5	110	50	614000	6140	NA	ug/kg
900-175	CL43-002	2084985.46	750090.89	Lithium	0	0.5	11.8	0.25	38400	38400	11.55	mg/kg
900-175	CL43-002	2084985.46	750090.89	Nickel	0	0.5	23.8	0.45	38400	38400	14.91	mg/kg
900-175	CL43-002	2084985.46	750090.89	Pyrene	0	0.5	450	42	57600000	57600000	NA	ug/kg
900-175	CL43-002	2084985.46	750090.89	Strontium	0	0.5	63.2	0.016	1000000	1000000	48.94	mg/kg

NA = not applicable
SD = standard deviation

Table 3
PAC 900-175 - Summary of Analytical Results

Analyte	Total Number Samples Analyzed	Detection Frequency	Maximum Concentration	Average Concentration	Tier I Action Level	Tier II Action Level	Background Mean +2SD	Unit
1,2,4-Trichlorobenzene	8	0.00%	190.625	335	19200000	19200000	NA	ug/kg
1,2-Dichlorobutane	8	0.00%	190.625	335	173000000	173000000	NA	ug/kg
1,3-Dichlorobenzene	8	0.00%	190.625	335	NA	NA	NA	ug/kg
1,4-Dichlorobutane	8	0.00%	190.625	335	18700000	187000	NA	ug/kg
2,4,5-Trichlorophenol	8	0.00%	190.625	335	192000000	192000000	NA	ug/kg
2,4,6-Trichlorophenol	8	0.00%	190.625	335	159000000	407000	NA	ug/kg
2,4-Dichlorophenol	8	0.00%	190.625	335	5760000	5760000	NA	ug/kg
2,4-Dimethylphenol	8	0.00%	190.625	335	38400000	38400000	NA	ug/kg
2,4-Dinitrophenol	8	0.00%	925	1650	384000000	3840000	NA	ug/kg
2,4-Dinitrotoluene	8	0.00%	190.625	335	659000	6590	NA	ug/kg
2,6-Dinitrotoluene	8	0.00%	190.625	335	659000	6590	NA	ug/kg
2-Chloronaphthalene	8	0.00%	190.625	335	154000000	154000000	NA	ug/kg
2-Chlorophenol	8	0.00%	190.625	335	9610000	9610000	NA	ug/kg
2-Methylnaphthalene	8	0.00%	190.625	335	76800000	76800000	NA	ug/kg
2-Methylphenol	8	0.00%	190.625	335	96100000	96100000	NA	ug/kg
2-Nitroaniline	8	0.00%	925	1650	115000	115000	NA	ug/kg
2-Nitrophenol	8	0.00%	190.625	335	NA	NA	NA	ug/kg
3,3'-Dichlorobenzidine	8	0.00%	743.75	1300	996000	9960	NA	ug/kg
3-Nitroaniline	8	0.00%	925	1650	NA	NA	NA	ug/kg
4,6-Dinitro-2-Methylphenol	8	0.00%	925	1650	192000	192000	NA	ug/kg
4-Chloro-3-Methylphenol	8	0.00%	190.625	335	NA	NA	NA	ug/kg
4-Chloroaniline	8	0.00%	190.625	335	7680000	7680000	NA	ug/kg
4-Chlorophenyl Phenyl Ether	8	0.00%	190.625	335	NA	NA	NA	ug/kg
4-Methylphenol	8	0.00%	190.625	335	9610000	9610000	NA	ug/kg
4-Nitroaniline	8	0.00%	925	1650	NA	NA	NA	ug/kg
4-Nitrophenol	8	0.00%	925	1650	15400000	15400000	NA	ug/kg

Analyte	Total Number Samples Analyzed	Detection Frequency	Maximum Concentration	Average Concentration	Tier I Action Level	Tier II Action Level	Background Mean +2SD	Unit
Actinium-228	6	100.00%	1.586	2.28	NA	NA	NA	pCi/g
Acenaphthylene	8	0.00%	190.625	335	NA	NA	NA	ug/kg
Acenapthene	8	0.00%	190.625	335	115000000	115000000	NA	ug/kg
Aluminum	7	100.00%	11807.1429	14900	1000000	1000000	16902	mg/kg
Americium-241	6	0.00%	4.43	4.43	215	38	0.02	pCi/g
Anthracene	8	0.00%	190.625	335	576000000	576000000	NA	ug/kg
Antimony	7	57.14%	1.28071429	3.9	768	768	16.97	mg/kg
Arsenic	7	100.00%	3.88571429	5	NA	NA	10.09	mg/kg
Barium	7	100.00%	85.4714286	101	133000	133000	141.26	mg/kg
Benzo(A)Anthracene	8	87.50%	181.125	335	614000	6140	NA	ug/kg
Benzo(A)Pyrene	8	75.00%	215.625	335	61400	614	NA	ug/kg
Benzo(B)Fluoranthene	8	75.00%	206.875	335	614000	6140	NA	ug/kg
Benzo(Ghi)Perylene	8	75.00%	168.875	335	NA	NA	NA	ug/kg
Benzo(K)Fluoranthene	8	75.00%	218.125	335	6140000	61400	NA	ug/kg
Benzoic Acid	8	0.00%	925	1650	1000000000	1000000000	NA	ug/kg
Benzyl Alcohol	8	0.00%	190.625	335	576000000	576000000	NA	ug/kg
Beryllium	7	100.00%	0.39714286	0.52	104	1.03999996	0.97	mg/kg
Bismuth-212	6	100.00%	1.59	2.31	NA	NA	NA	pCi/g
Bismuth-214	6	100.00%	0.69233333	1	NA	NA	NA	pCi/g
Bis(2-Chlorethyl)Ether	8	0.00%	190.625	335	407000	4070.00024	NA	ug/kg
Bis(2-Chloroethoxy)Methane	8	0.00%	190.625	335	NA	NA	NA	ug/kg
Bis(2-Chloroisopropyl)Ether	8	0.00%	190.625	335	NA	NA	NA	ug/kg
Bis(2-Ethylhexyl)Phthalate	8	100.00%	2429.625	9700	32000000	320000	NA	ug/kg
Boron	7	85.71%	2.50642857	4.6	NA	NA	NA	mg/kg
Butyl Benzylphthalate	8	0.00%	190.625	335	384000000	384000000	NA	ug/kg
Cadmium	28	85.71%	0.25392857	0.85	1920	1920	1.61	mg/kg
Calcium	7	100.00%	24244.2857	55900	NA	NA	NA	mg/kg
Cesium-134	6	100.00%	0.03663333	0.0987	NA	NA	0.31	pCi/g

Analyte	Total Number Samples Analyzed	Detection Frequency	Maximum Concentration	Average Concentration	Tier I Action Level	Tier II Action Level	Background Mean +2SD	Unit
Chromium	7	100.00%	64.1571429	114	44300	4410	16.99	mg/kg
Chrysene	8	87.50%	226.625	390	61400000	614000	NA	ug/kg
Cobalt	7	100.00%	4.6	5.8	115000	115000	10.91	mg/kg
Copper	7	100.00%	34.4571429	74.4	71100	71100	18.1	mg/kg
Di-N-Butyl Phthalate	8	12.50%	185.625	335	NA	NA	NA	ug/kg
Di-N-Octylphthalate	8	0.00%	190.625	335	1000000000	38400000	NA	ug/kg
Dibenz(A,H)Anthracene	8	12.50%	177.375	335	61400	614	NA	ug/kg
Dibenzofuran	8	0.00%	190.625	335	7680000	7680000	NA	ug/kg
Diethyl Phthalate	8	0.00%	378.125	650	1000000000	1000000000	NA	ug/kg
Dimethly Phthalate	8	25.00%	201.25	335	1000000000	1000000000	NA	ug/kg
Fluoranthene	8	87.50%	416.875	690	76800000	76800000	NA	ug/kg
Fluorene	8	0.00%	190.625	335	76800000	76800000	NA	ug/kg
Hexachlorobenzene	8	0.00%	190.625	335	280000	2800	NA	ug/kg
Hexachlorobutadiene	8	0.00%	190.625	335	5750000	57500	NA	ug/kg
Hexachlorocyclopentadiene	8	0.00%	378.125	650	13300000	13300000	NA	ug/kg
Hexachloroethane	8	0.00%	190.625	335	125000000	320000	NA	ug/kg
Indeno(1,2,3-Cd)Pyrene	8	75.00%	154.75	335	614000	6140	NA	ug/kg
Iron	7	100.00%	15242.8571	18900	576000	576000	18037	mg/kg
Isophorone	8	0.00%	190.625	335	1000000000	4720000	NA	ug/kg
Potassium-40	6	100.00%	21.25	29	NA	NA	NA	pCi/g
Lead	7	100.00%	27.1857143	40.2	1000	1000	54.62	mg/kg
Lithium	7	100.00%	10.4428571	11.8	38400	38400	11.55	mg/kg
Magnesium	7	100.00%	2645.71429	3280	NA	NA	2849.30	mg/kg
Manganese	7	100.00%	182.571429	269	83600	83600	365.08	mg/kg
Mercury	7	100.00%	0.01965714	0.036	576	576	0.13	mg/kg
Molybdenum	7	100.00%	1.42714286	2.4	9610	9610	MA	mg/kg
N-Nitrosodi-N-Propylamine	8	0.00%	190.625	335	64000	640	NA	ug/kg
N-Nitrosodiphenylamine	8	0.00%	190.625	335	365000000	915000	NA	ug/kg

Analyte	Total Number Samples Analyzed	Detection Frequency	Maximum Concentration	Average Concentration	Tier I Action Level	Tier II Action Level	Background Mean +2SD	Unit
Naphthalene	8	0.00%	190.625	335	76800000	76800000	NA	ug/kg
Nickel	7	100.00%	43.4857143	69.7	38400	38400	14.9	mg/kg
Nitrate	7	100.00%	3.48571429	11.1	1000000	1000000	NA	mg/kg
Nitrite	7	85.71%	1.57857143	2.55	192000	192000	NA	mg/kg
Nitrobenzene	8	0.00%	190.625	335	961000	961000	NA	ug/kg
P-Bromodiphenyl Ether	8	0.00%	190.625	335	NA	NA	NA	ug/kg
Protactinium-234	6	100.00%	0	0	NA	NA	NA	pCi/g
Protactinium-234m	6	100.00%	0.61333333	3.68	NA	NA	NA	pCi/g
Lead-212	6	100.00%	1.505	2.03	NA	NA	NA	pCi/g
Lead-214	6	100.00%	0.7315	0.896	NA	NA	NA	pCi/g
Pentachlorophenol	8	0.00%	925	1650	14900000	37400	NA	ug/kg
Phenanthrene	8	87.50%	205.625	335	NA	NA	NA	ug/kg
Phenanthrene, 1-Methyl-	1	100.00%	550	550	NA	NA	NA	ug/kg
Phenol	8	0.00%	190.625	335	1000000000	1000000000	NA	ug/kg
Polonium-210	6	100.00%	0	0	NA	NA	NA	pCi/g
Potassium	7	100.00%	2505.71429	2920	NA	NA	2967.20	mg/kg
Pyrene	8	100.00%	363.75	690	57600000	57600000	NA	ug/kg
Radium-226	6	100.00%	2.68666667	3.64	NA	NA	NA	pCi/g
Selenium	7	28.57%	0.30857143	0.66	9610	9610	1.22	mg/kg
Silica	7	100.00%	416.142857	478	NA	NA	NA	mg/kg
Silver	7	0.00%	0.03307143	0.0335	9610	9610	NA	mg/kg
Sodium	7	0.00%	76.5	78	NA	NA	91.84	mg/kg
Strontium	7	100.00%	34.8428571	63.2	1000000	1000000	48.94	mg/kg
Thorium-231	6	100.00%	0.07583333	0.455	NA	NA	NA	pCi/g
Thallium	7	57.14%	0.56142857	0.93	NA	NA	NA	mg/kg
Thorium-230	6	100.00%	0	0	NA	NA	NA	pCi/g
Tin	7	100.00%	1.62857143	2.3	1000000	1000000	NA	mg/kg
Titanium	7	100.00%	225.928571	342	NA	NA	NA	mg/kg

Analyte	Total Number Samples Analyzed	Detection Frequency	Maximum Concentration	Average Concentration	Tier I Action Level	Tier II Action Level	Background Mean +2SD	Unit
Thallium-208	6	100.00%	0.52266667	0.704	NA	NA	NA	pCi/g
Uranium (total)	7	0.00%	2.85714286	2.9	NA	NA	NA	mg/kg
Uranium-235	6	0.00%	0	0	135	24	0.09	pCi/g
Uranium-238	6	0.00%	1.52933333	2.9	586	103	2	pCi/g
Vanadium	7	100.00%	27.1428571	30.4	13400	13400	45.59	mg/kg
Zinc	7	100.00%	104.8	172	576000	576000	73.76	mg/kg

SD = standard deviation
NA = not applicable

3.0 DEVIATIONS FROM PLANNED SAMPLING SPECIFICATIONS

Deviations from the planned sampling specifications described in IASAP Addendum #IA-02-02 (DOE 2002a) are presented in the following table.

Table 4
PAC 900-175 - Deviations from Planned Sampling Specifications

Sampling Location Code	Planned Easting	Planned Northing	Actual Easting	Actual Northing	Comments
CL43-0002	2084965.91	750060.59	2084985.46	750090.89	All sample location deviations resulted from utilities, structures, or auger refusal.
CK43-0002	2084929.95	750062.37	2084894.08	750064.21	
CL43-0001	2084985.43	750090.83	2084949.48	750092.62	
CL43-0000	2084949.48	750092.62	2084913.24	750078.42	
CK43-0000	2084913.52	750094.40	2084949.95	750075.39	

4.0 DATA QUALITY ASSESSMENT

The Data Quality Objectives (DQOs) for this project are described in the IASAP (DOE 2001). All DQOs for this project were achieved based on the following:

- Regulatory agency approved sampling program design (IASAP Addendum 02-02 [DOE 2002a);
- Collection of samples in accordance with the sampling design;
- Results of the Data Quality Assessment (DQA) as described in the following sections.

4.1 Data Quality Assessment Process

The DQA process ensures that the type, quantity and quality of environmental data used in decision making are defensible, and is based on the following guidance and requirements:

- EPA QA/G-4, 1994a, Guidance for the Data Quality Objective Process;
- EPA QA/G-9, 1998, Guidance for the Data Quality Assessment Process; Practical Methods for Data Analysis; and
- DOE Order 414.1A, 1999, Quality Assurance.

Verification and validation (V&V) of the data are the primary components of the DQA. The final data are compared with original project DQOs and evaluated with respect to project decisions; uncertainty within the decisions; and quality criteria required for the data, specifically precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS). Validation criteria are consistent with the following RFETS-specific documents and industry guidelines:

64

- EPA 540/R-94/012, 1994b, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review;
- EPA 540/R-94/013, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review; and
- Kaiser-Hill Company, L.L.C.(K-H) V&V Guidelines:
  - General Guidelines for Data Verification and Validation, DA-GR01-v1, 2002a.
  - V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v1, 2002b.
  - V&V Guidelines for Volatile Organics, DA-SS01-v1, 2002c.
  - V&V Guidelines for Semivolatile Organics, DA-SS02-v1, 2002d.
  - V&V Guidelines for Metals, DA-SS05-v1, 2002e.
- Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

This report will be submitted to the Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA) Administrative Record (AR) for permanent storage 30 days after being provided to the Colorado Department of Public Health and Environment (CDPHE) and the U.S. Environmental Protection Agency (EPA).

4.2 Verification and Validation of Results

Verification ensures that data produced and used by the project are documented and traceable in accordance with quality requirements. Validation consists of a technical review of all data that directly support the project decisions so that any limitations of the data relative to project goals are delineated and the associated data are qualified accordingly. The V&V process defines the criteria that constitute data quality, namely PARCCS parameters. Data traceability and archival are also addressed. V&V criteria include the following:

- Chain-of-custody;
- Preservation and hold-times;
- Instrument calibrations;
- Preparation blanks;
- Interference check samples (metals);
- Matrix spikes/matrix spike duplicates (MS/MSD);
- Laboratory control samples (LCS);

65

- Field duplicate measurements;
- Chemical yield (radiochemistry);
- Required quantitation limits/minimum detectable activities (sensitivity of chemical and radiochemical measurements, respectively); and
- Sample analysis and preparation methods.

Evaluation of V&V criteria ensures that PARCCS parameters are satisfactory (i.e., within tolerances acceptable to the project). Satisfactory V&V of laboratory quality controls are captured through application of validation "flags"or qualifiers to individual records.

Raw hardcopy data (e.g., individual analytical data packages) are currently filed by RIN and are maintained by Kaiser-Hill Analytical Services Division; older hardcopies may reside in the Federal Center in Lakewood, Colorado. Electronic data are stored in the RFETS Soil and Water Database.

Both real and QC data, as of June 11, 2003 are included on the enclosed compact disks (CDs).

4.2.1 Accuracy

The following measures of accuracy were evaluated:

- Laboratory Control Sample Evaluation;
- Surrogate Evaluation;
- Field Blanks; and
- Sample Matrix Spike Evaluation.

Results are compared to method requirements and project goals. The results of these comparisons are summarized for RFCA COCs where the result could impact project decisions. Particular attention is paid to those values near ALs when quality control (QC) results could indicate unacceptable levels of uncertainty for decision-making purposes.

Laboratory Control Sample Evaluation

The frequency of LCS measurements, relative to each laboratory batch, is given in Table 5. LCS frequency was adequate based on at least one LCS per batch. The minimum and maximum LCS results are also tabulated, by chemical, for the entire project. While not all LCS results are within tolerances, project decisions based on AL exceedances were not affected. Any qualifications of results due to LCS performance exceeding upper or lower tolerance limits are captured in the V&V flags, described in the Completeness Section.

Surrogate Evaluation

The frequency of surrogate measurements, relative to each laboratory batch, is given in Table 6. Surrogate frequency was adequate based on at least one set per sample. The

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Table 5
Laboratory Control Sample Evaluation

CAS No.	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
120-82-1	1,2,4-TRICHLOROBENZENE	LC	68	76	2	2	%REC	SW-846 8270B
121-14-2	2,4-DINITROTOLUENE	LC	75	85	2	2	%REC	SW-846 8270B
95-57-8	2-CHLOROPHENOL	LC	70	73	2	2	%REC	SW-846 8270B
83-32-9	ACENAPHTHENE	LC	69	74	2	2	%REC	SW-846 8270B
7429-90-5	ALUMINUM	LC	92	94	2	2	%REC	SW-846 6010/6010B
7440-36-0	ANTIMONY	LC	88	90	2	2	%REC	SW-846 6010/6010B
7440-38-2	ARSENIC	LC	91	92	2	2	%REC	SW-846 6010/6010B
7440-39-3	BARIUM	LC	93	95	2	2	%REC	SW-846 6010/6010B
7440-41-7	BERYLLIUM	LC	90	90	2	2	%REC	SW-846 6010/6010B
7440-43-9	CADMIUM	LC	91	93	2	2	%REC	SW-846 6010/6010B
7440-48-4	COBALT	LC	88	90	2	2	%REC	SW-846 6010/6010B
7440-50-8	COPPER	LC	90	91	2	2	%REC	SW-846 6010/6010B
7439-89-6	IRON	LC	97	100	2	2	%REC	SW-846 6010/6010B
7439-92-1	LEAD	LC	90	93	2	2	%REC	SW-846 6010/6010B
7439-93-2	LITHIUM	LC	95	100	2	2	%REC	SW-846 6010/6010B
7439-96-5	MANGANESE	LC	91	93	2	2	%REC	SW-846 6010/6010B
7439-97-6	MERCURY	LC	93	93	1	1	%REC	SW-846 6010/6010B
[illegible]98-7	MOLYBDENUM	LC	87	90	2	2	%REC	SW-846 6010/6010B
7440-02-0	NICKEL	LC	91	93	2	2	%REC	SW-846 6010/6010B
14797-55-8	NITRATE AS N	LC	94	95	2	2	%REC	SW9056 OR E300.0 PREP E300.0
14797-65-0	NITRITE AS N	LC	96	96	2	2	%REC	SW9056 OR E300.0 PREP E300.0
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	LC	70	72	2	2	%REC	SW-846 8270B
106-46-7	P-DICHLOROBENZENE	LC	68	73	2	2	%REC	SW-846 8270B
87-86-5	PENTACHLOROPHENOL	LC	66	70	2	2	%REC	SW-846 8270B
108-95-2	PHENOL	LC	70	75	2	2	%REC	SW-846 8270B
100-02-7	P-NITROPHENOL	LC	62	66	2	2	%REC	SW-846 8270B
129-00-0	PYRENE	LC	63	72	2	2	%REC	SW-846 8270B
7782-49-2	SELENIUM	LC	89	93	2	2	%REC	SW-846 6010/6010B
7440-22-4	SILVER	LC	92	93	2	2	%REC	SW-846 6010/6010B
7440-24-6	STRONTIUM	LC	92	94	2	2	%REC	SW-846 6010/6010B
7440-31-5	TIN	LC	88	89	2	2	%REC	SW-846 6010/6010B
7440-62-2	VANADIUM	LC	90	91	2	2	%REC	SW-846 6010/6010B
7440-66-6	ZINC	LC	90	95	2	2	%REC	SW-846 6010/6010B

67

Table 6
Surrogate Recovery Summary

VOC Surrogate Recoveries				
Number of Samples	Analyte	Minimum	Maximum	Unit Code
2	1,2-DICHLOROETHANE-D4	90	94	%REC
2	4-BROMOFLUOROBENZENE	94	95	%REC
2	TOLUENE-D8	95	95	%REC
SVOC Surrogate Recoveries				
Number of Samples	Analyte	Minimum	Maximum	Unit Code
12	TERPHENYL-D14	69	88	%REC
12	2-FLUOROBIPHENYL	65	83	%REC
12	2-FLUOROPHENOL	60	79	%REC
12	NITROBENZENE-D5	59	79	%REC

minimum and maximum surrogate results are also tabulated, by chemical, for the entire project. Any qualifications of results due to surrogate results are captured in the V&V flags, described in the Completeness Section.

Field Blank Evaluation

Results of the field blank analyses are given in Table 7. Detectable amounts of contaminants within the blanks, which could indicate possible cross-contamination of samples, are evaluated if the same contaminant is detected in the associated real samples. When the real result is less than 10 times the blank result for laboratory contaminants and 5 times the result for non-laboratory contaminants, the real result is eliminated. None of the chemicals detected in blanks were detected at concentrations greater than ALs, therefore no significant blank contamination is indicated.

Table 7
Field Blank Summary

Sample QC Code	Test Method Name	Analyte	Maximum Detected Value	Unit
RB	GAMMA	Uranium-235	0.2	pCi/g
RB	GAMMA	Uranium-238	4	pCi/g
FB	SW8260B	Toluene	2	ug/L
RB	SW8260B	Toluene	0.3	ug/L
FB	SW8260B	2-Butanone	4	ug/L
FB	SW8260B	Naphthalene	0.8	ug/L
Field Blanks (Trip, Rinse, Field) results greater than detection limits (not *U* Qualified)				

Sample Matrix Spike Evaluation

The frequency of MS measurements, relative to each laboratory batch, was adequate based on at least one MS per batch. The minimum and maximum of MS results are summarized by chemical, for the entire project in Table 8. Although low recovery values may indicate negative bias for some analytes, recovery values alone do not result in

68

rejection of results. Qualifications of results due to spike recoveries out of tolerance are captured in electronic flagging of the results.

Table 8
Sample Matrix Spike Evaluation

CAS No.	Analyte	Result Type	Minimum	Maximum	Number of Laboratory Samples	Number of Laboratory Batches	Unit	Test Method
120-82-1	1,2,4-TRICHLOROBENZENE	MS	62	68	2	2	%REC	SW-846 8270B
121-14-2	2,4-DINITROTOLUENE	MS	70	85	2	2	%REC	SW-846 8270B
95-57-8	2-CHLOROPHENOL	MS	64	70	2	2	%REC	SW-846 8270B
83-32-9	ACENAPHTHENE	MS	64	75	2	2	%REC	SW-846 8270B
7429-90-5	ALUMINUM	MS	98	314	3	3	%REC	SW-846 6010/6010B
7440-36-0	ANTIMONY	MS	35	97	3	3	%REC	SW-846 6010/6010B
7440-38-2	ARSENIC	MS	91	97	3	3	%REC	SW-846 6010/6010B
7440-39-3	BARIUM	MS	102	103	3	3	%REC	SW-846 6010/6010B
7440-41-7	BERYLLIUM	MS	91	97	3	3	%REC	SW-846 6010/6010B
7440-43-9	CADMIUM	MS	90	100	3	3	%REC	SW-846 6010/6010B
7440-48-4	COBALT	MS	88	97	3	3	%REC	7440-48-4
7440-50-8	COPPER	MS	97	108	3	3	%REC	7440-50-8
7439-89-6	IRON	MS	102	672	3	3	%REC	7439-89-6
7439-92-1	LEAD	MS	94	99	3	3	%REC	7439-92-1
7439-93-2	LITHIUM	MS	100	105	3	3	%REC	7439-93-2
7439-96-5	MANGANESE	MS	98	100	3	3	%REC	7439-96-5
7439-97-6	MERCURY	MS	48	48	1	1	%REC	7439-97-6
7439-98-7	MOLYBDENUM	MS	83	98	3	3	%REC	7439-98-7
7440-02-0	NICKEL	MS	98	117	3	3	%REC	7440-02-0
14797-55-8	NITRATE AS N	MS	94	94	1	1	%REC	14797-55-8
14797-55-8	NITRATE AS N	MS	89	89	1	1	%REC	14797-55-8
14797-65-0	NITRITE AS N	MS	100	100	1	1	%REC	14797-65-0
14797-65-0	NITRITE AS N	MS	91	91	1	1	%REC	14797-65-0
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	MS	63	67	2	2	%REC	621-64-7
106-46-7	P-DICHLOROBENZENE	MS	60	65	2	2	%REC	106-46-7
87-86-5	PENTACHLOROPHENOL	MS	52	52	2	2	%REC	87-86-5
108-95-2	PHENOL	MS	64	71	2	2	%REC	108-95-2
100-02-7	P-NITROPHENOL	MS	60	61	2	2	%REC	100-02-7
129-00-0	PYRENE	MS	65	76	2	2	%REC	129-00-0
7782-49-2	SELENIUM	MS	90	96	3	3	%REC	7782-49-2
7440-22-4	SILVER	MS	90	102	3	3	%REC	7440-22-4
7440-24-6	STRONTIUM	MS	99	101	3	3	%REC	7440-24-6
7440-31-5	TIN	MS	85	97	3	3	%REC	7440-31-5
7440-62-2	VANADIUM	MS	100	121	3	3	%REC	7440-62-2
7440-66-6	ZINC	MS	78	98	3	3	%REC	7440-66-6

4.2.2 Precision

Matrix Spike Duplicate Evaluation

Laboratory precision is measured through use of MSD. Adequate frequency of MSD measurements is indicated by at least one MSD in each laboratory batch. Although some RPD values, listed in Table 9, exceed the maximum target of 35 percent, all sample results were repeatable at concentrations well below their respective ALs.

Table 9
Sample Matrix Spike Duplicate Evaluation

Analyte Name	Number of Sample Pairs	Number of Laboratory Batches	Max RPD (%)
1,2,4-TRICHLOROBENZENE	2	2	8
2,4-DINITROTOLUENE	2	2	8
2-CHLOROPHENOL	2	2	8
ACENAPHTHENE	2	2	5
ALUMINUM	3	3	3
ANTIMONY	3	3	1
ARSENIC	3	3	7
BARIUM	3	3	9
BERYLLIUM	3	3	6
CADMIUM	3	3	6
CADMIUM	3	3	6
COBALT	3	3	7
COPPER	3	3	25
IRON	3	3	98
LEAD	3	3	121
LITHIUM	3	3	7
MANGANESE	3	3	43
MERCURY	1	1	33
MOLYBDENUM	3	3	6
NICKEL	3	3	75
NITRATE AS N	1	1	1
NITRATE AS N	1	1	5
NITRITE AS N	1	1	1
NITRITE AS N	1	1	4
N-NITROSO-DI-N-PROPYLAMINE	2	2	9
P-DICHLOROBENZENE	2	2	7
PENTACHLOROPHENOL	2	2	7
PHENOL	2	2	11
P-NITROPHENOL	2	2	5
PYRENE	2	2	3
SELENIUM	3	3	5
SILVER	3	3	7
STRONTIUM	3	3	11

70

Analyte Name	Number of Sample Pairs	Number of Laboratory Batches	Max RPD (%)
TIN	3	3	6
VANADIUM	3	3	10
ZINC	3	3	12

Field Duplicate Evaluation

Field duplicate results reflect sampling precision, or overall repeatability of the sampling process. The frequency of field duplicate collection should exceed 1 field duplicate per 20 real samples, or 5 percent. Table 10 indicates that sampling frequencies were adequate. A common metric for evaluating precision is the relative percent difference (RPD) value; RPD values are given in Table 11. Ideally, RPDs of less than 35 percent (in soil) indicate satisfactory precision. Values exceeding 35 percent only affect project decisions if the imprecision is great enough to cause contradictory decisions relative to the contaminant of concern (COC) (i.e., one sample indicates clean soil whereas the QC partner does not). As indicated by the data in Table 11, a number of analytes, generally SVOCs, have RPDs greater than 35 percent. However, all samples for these suites, real and duplicate, were repeatable at concentrations well below ALs; consequently, the high RPD values do not affect project decisions.

Table 10
Field Duplicate Sample Frequency

Test Method Name	Sample Code	Number of Samples	% Duplicate Samples
GAMMA SPECTROSCOPY	REAL	6	0
SW-846 6010/6010B	REAL	6	17
SW-846 6010/6010B	DUP	1	
SW-846 8270B	REAL	6	17
SW-846 8270B	DUP	1	
SW9056 OR E300.0 PREP E300.0	REAL	6	17
SW9056 OR E300.0 PREP E300.0	DUP	1	

Table 11
RPD Evaluation

Analyte	Max of RPD %
1,2,4-TRICHLOROBENZENE	0
2,4,5-TRICHLOROPHENOL	0
2,4,6-TRICHLOROPHENOL	0
2,4-DICHLOROPHENOL	0
2,4-DIMETHYLPHENOL	0

71

2,4-DINITROPHENOL	0
2,4-DINITROTOLUENE	0
2,6-DINITROTOLUENE	0
2-CHLORONAPHTHALENE	0
2-CHLOROPHENOL	0
2-NITROANILINE	0
4-CHLOROANILINE	0
ACENAPHTHENE	0
ALUMINUM	2
ANTHRACENE	0
ANTIMONY	26
ARSENIC	8
BARIUM	5
BENZO(A)ANTHRACENE	37
BENZO(A)PYRENE	24
BENZO(B)FLUORANTHENE	19
BENZO(K)FLUORANTHENE	42
BENZOIC ACID	0
BERYLLIUM	29
BIS(2-ETHYLHEXYL)PHTHALATE	162
BUTYLBENZYLPHTHALATE	0
CHRYSENE	33
COBALT	2
COPPER	49
DIBENZ(A,H)ANTHRACENE	0
DIBENZOFURAN	0
FLUORANTHENE	29
FLUORENE	0
HEXACHLOROBENZENE	0
HEXACHLOROBUTADIENE	0
HEXACHLOROCYCLOPENTADIENE	1
HEXACHLOROETHANE	0
INDENO(1,2,3-CD)PYRENE	20
IRON	17
ISOPHORONE	0
LEAD	57
LITHIUM	6
MANGANESE	4
MERCURY	30
MOLYBDENUM	108
NAPHTHALENE	0
NICKEL	3
NITROBENZENE	0
N-NITROSODIPHENYLAMINE	0
PENTACHLOROPHENOL	0
PHENOL	0
PYRENE	37
SELENIUM	2
SILVER	0

STRONTIUM	21
TIN	34
VANADIUM	3
ZINC	2

Completeness

Based on original project DQOs, a minimum of 25 percent of ER Program analytical (and radiological) results must be formally verified and validated. Of that percentage, no more than 10 percent of the results may be rejected, which ensures that analytical laboratory practices are consistent with quality requirements. Table 12 shows the number and percentage of validated records (codes without "1"), the number and percentage of verified records (codes with "1"), and the percentage of rejected records for each analyte group. The frequency of validation is within project quality requirements for all suites except radionuclides. A check of hardcopy V&V records indicates that validation frequency is better than the minimum of 25 percent for both alpha and gamma spectroscopy, but the associated validation flags have not yet been uploaded to electronic records in the Soil Water Database (SWD). Following upload of the V&V flags to SWD, the validation frequency of electronic records will be acceptable.

The frequency of validation is in compliance with the RFETS validation goal of 25 percent of all analytical records indicating that these data are adequate.

4.2.3 Sensitivity

Reporting limits, in units of ug/kg for organics, mg/kg for metals, and pCi/g for radionuclides, were compared with proposed RFCA WRW and Ecological Receptor ALs. Adequate sensitivities of analytical methods were attained for all COCs that affect project decisions. "Adequate" sensitivity is defined as a reporting limit less than an analyte's associated AL, typically less than one-half the AL.

4.3 Summary of Data Quality

The RPDs greater than 35 percent indicate that the sampling precision limits some analytes has been exceeded. However, the imprecision does not affect project decisions because the only AL exceedances is arsenic. The arsenic RPD was less than 35 percent, and does not affect project decisions. No records were rejected. Compliance with the project quality requirements and RFETS validation goal of 25 percent of all analytical records indicates that these data are adequate. When additional V&V information is received, IHSS Group 900-4&5 records will be updated in SWD. Data qualified as a result of additional data will be assessed as part of the Comprehensive Risk Assessment process. Data collected and used for IHSS Group 900-4&5 are adequate for decision-making.

Table 12
Validation and Verification Summary

Validation Code	Number of Records	Radionuclides	Metals	Inorganics
No V&V	185	119	0	0
J	81	0	81	0
V	514	0	105	12
Total	780	119	186	12
Total Validated	595	0	186	12
% Validated	76%	0%	100%	100%
Total Verified	595	0	186	12
% Verified	76%	0%	100%	100%
% Rejected	0.00%	0.00%	0.00%	0.00%

KEY:
1, V1 - Verified
J, J1 - Estimated
UJ1 - Estimated detection limit
V - Validated

TG

5.0 REFERENCES

DOE, 1992-2001, Historical Release Report for the Rocky Flats Plant, Rocky Flats Plant, Golden, Colorado, June.

DOE, 1999, Order 414.1A, Quality Assurance.

DOE, 2000, Rocky Flats Cleanup Agreement (RFCA), Attachment 5, March.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002a, Industrial Area Sampling and Analysis Plan Addendum #IA-02-02, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2002b, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

EPA QA/G-4, 1994a, Guidance for the Data Quality Objective Process.

EPA 540/R-94/012, 1994b, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review.

EPA 540/R-94/013, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.

EPA QA/G-9, 1998, Guidance for the Data Quality Assessment Process; Practical Methods for Data Analysis.

Kaiser-Hill (K-H), 2002a, General Guidelines for Data Verification and Validation, DA-GR01-v1, December.

K-H, 2002b, V&V Guidelines for Volatile Organics, DA-SS01-v1, December.

K-H, 2002c, V&V Guidelines for Semivolatile Organics, DA-SS02-v1, December.

K-H, 2002d, V&V Guidelines for Metals, DA-SS05-v1, December.

K-H, 2002e, V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v1, February.

Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

APPENDIX A

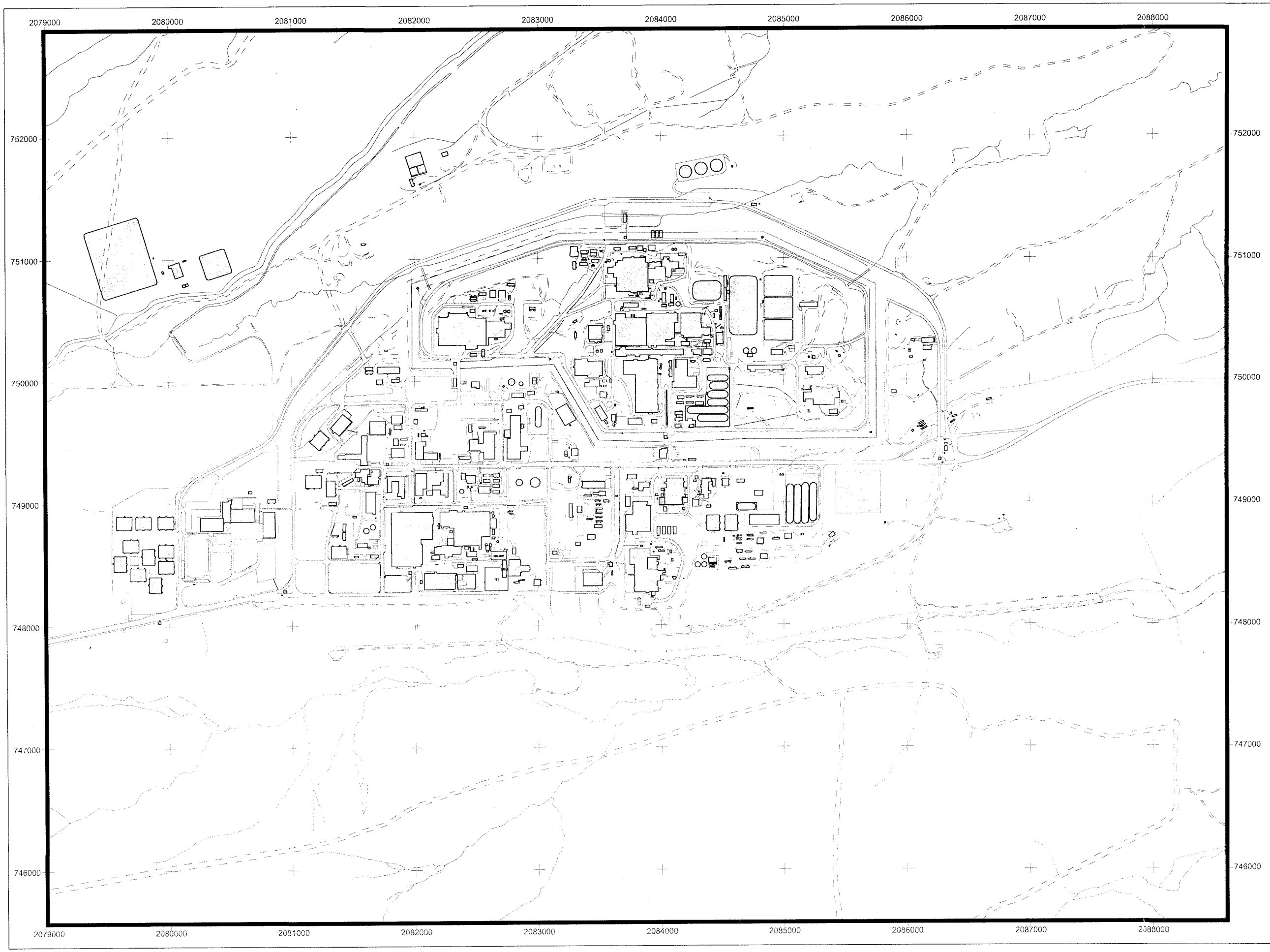
PAC 900-175 - RAW DATA

APPENDIX B

IHSS GROUP 900-4&5

WRW ACTION LEVEL COMPARISON TABLE

Figure 1
Location of
IHSS Group 400-10



KEY

- IHSS Group 400-10
- Building
- Stream, ditch, or other drainage
- Paved Area
- Dirt road

N

600 0 600 Feet

Scale = 1:10,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: Date: August 2002

RADMS

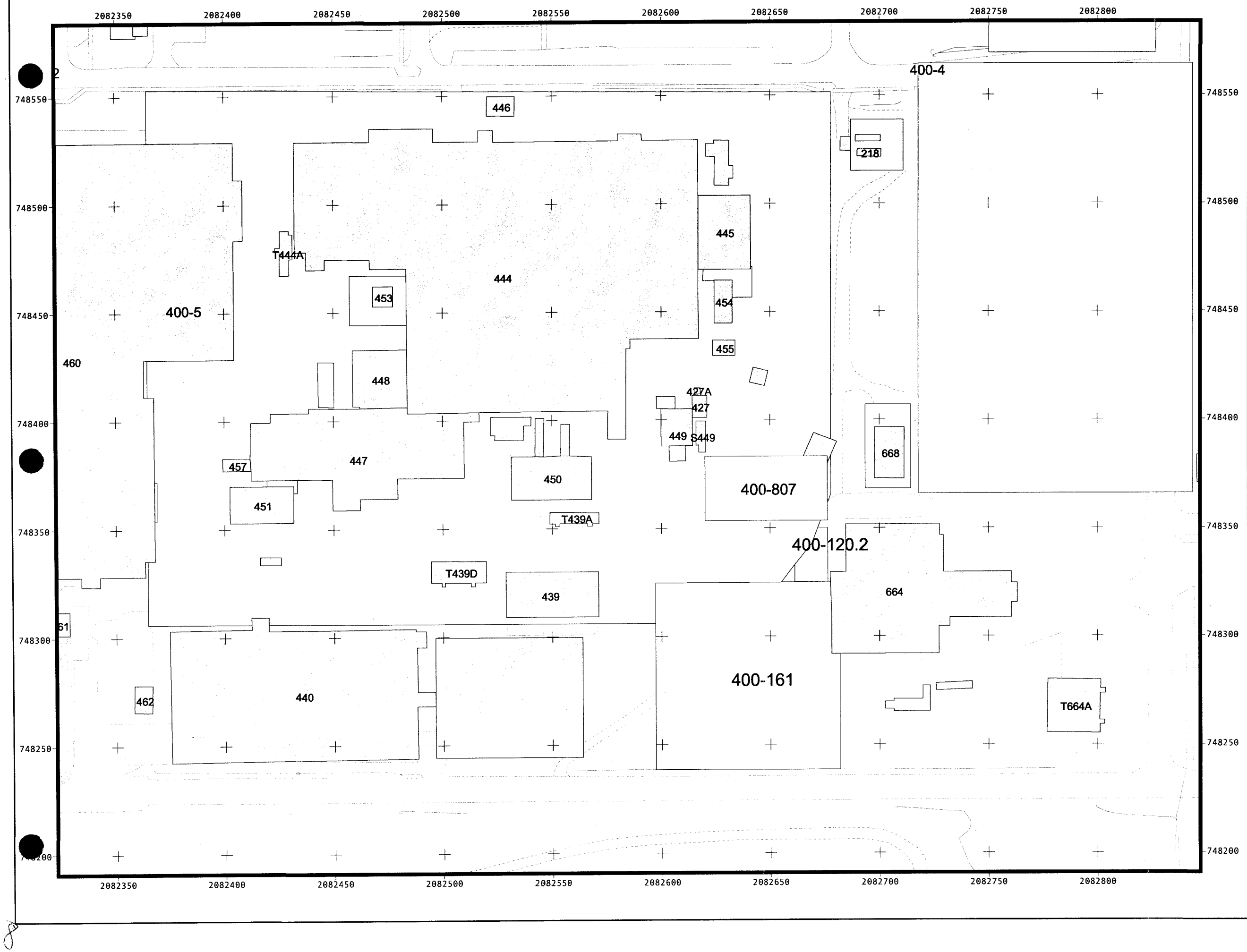
Prepared for:

KAISER•HILL COMPANY

File: w:/projects/fy2002/400-10/Group 400-10sps.apr

7

Figure 2
IHSS Group 400-10
(400-120.2, 400-161 and 400-807)



KEY

PAC

IHSS

Building

Paved Road

N
W
E
S

30 0 30 60 Feet

Scale = 1:1200

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

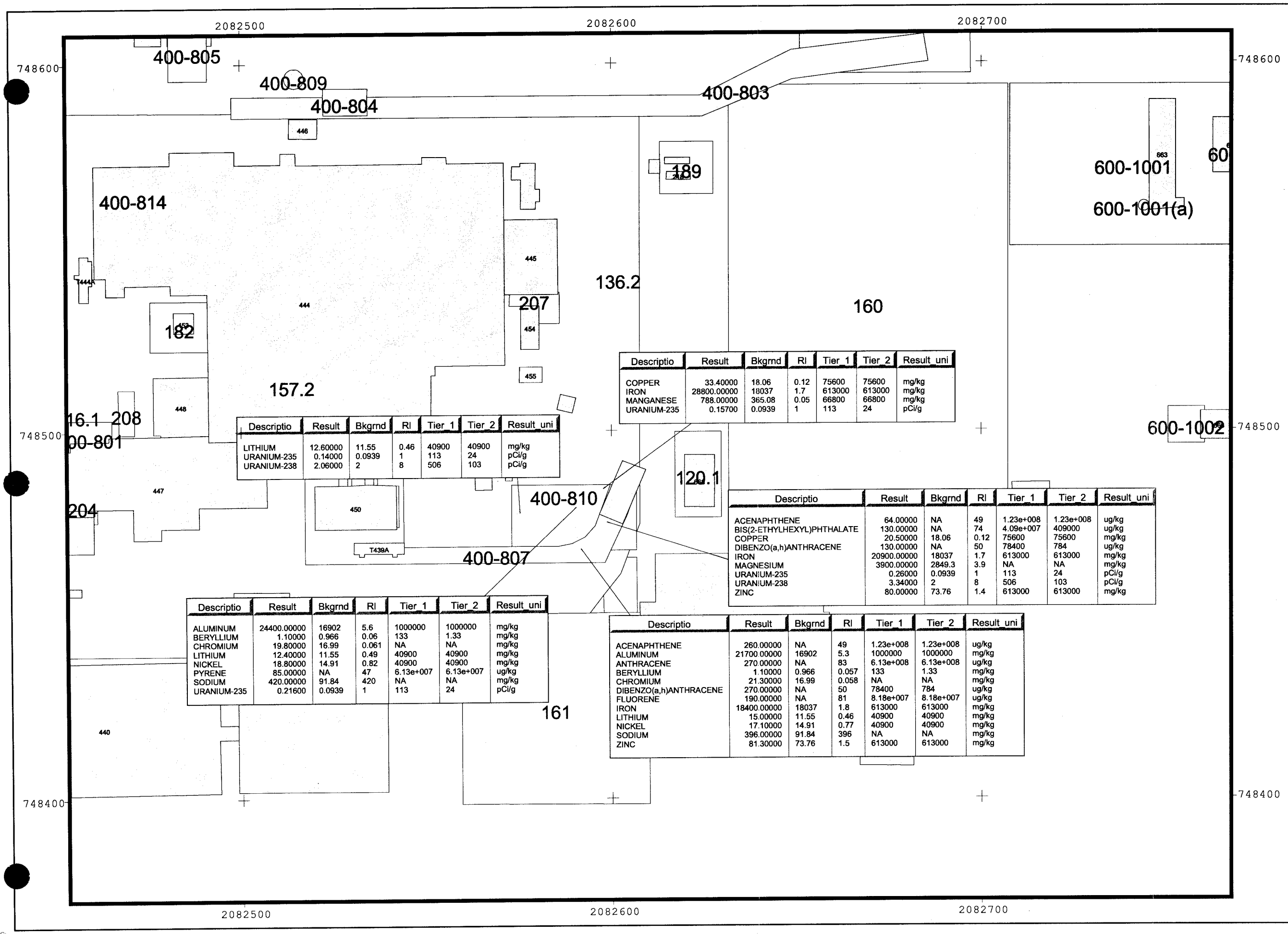
Prepared by: Date: August 2002

RADMS

Prepared for:

KAISER•HILL COMPANY

File: w:/projects/fy2002/400-10/hrr pac 400-807.apr



Descriptio	Result	Bkgrnd	RI	Tier_1	Tier_2	Result_uni
LITHIUM	12.60000	11.55	0.46	40900	40900	mg/kg
URANIUM-235	0.14000	0.0939	1	113	24	pCi/g
URANIUM-238	2.06000	2	8	506	103	pCi/g

Descriptio	Result	Bkgrnd	RI	Tier_1	Tier_2	Result_uni
COPPER	33.40000	18.06	0.12	75600	75600	mg/kg
IRON	28800.00000	18037	1.7	613000	613000	mg/kg
MANGANESE	788.00000	365.08	0.05	66800	66800	mg/kg
URANIUM-235	0.15700	0.0939	1	113	24	pCi/g

Descriptio	Result	Bkgrnd	RI	Tier_1	Tier_2	Result_uni
ACENAPHTHENE	64.00000	NA	49	1.23e+008	1.23e+008	ug/kg
BIS(2-ETHYLHEXYL)PHTHALATE	130.00000	NA	74	4.09e+007	409000	ug/kg
COPPER	20.50000	18.06	0.12	75600	75600	mg/kg
DIBENZO(a,h)ANTHRACENE	130.00000	NA	50	78400	784	ug/kg
IRON	20900.00000	18037	1.7	613000	613000	mg/kg
MAGNESIUM	3900.00000	2849.3	3.9	NA	NA	mg/kg
URANIUM-235	0.26000	0.0939	1	113	24	pCi/g
URANIUM-238	3.34000	2	8	506	103	pCi/g
ZINC	80.00000	73.76	1.4	613000	613000	mg/kg

Descriptio	Result	Bkgrnd	RI	Tier_1	Tier_2	Result_uni
ALUMINUM	24400.00000	16902	5.6	1000000	1000000	mg/kg
BERYLLIUM	1.10000	0.966	0.06	133	1.33	mg/kg
CHROMIUM	19.80000	16.99	0.061	NA	NA	mg/kg
LITHIUM	12.40000	11.55	0.49	40900	40900	mg/kg
NICKEL	18.80000	14.91	0.82	40900	40900	mg/kg
PYRENE	85.00000	NA	47	6.13e+007	6.13e+007	ug/kg
SODIUM	420.00000	91.84	420	NA	NA	mg/kg
URANIUM-235	0.21600	0.0939	1	113	24	pCi/g

Descriptio	Result	Bkgrnd	RI	Tier_1	Tier_2	Result_uni
ACENAPHTHENE	260.00000	NA	49	1.23e+008	1.23e+008	ug/kg
ALUMINUM	21700.00000	16902	5.3	1000000	1000000	mg/kg
ANTHRACENE	270.00000	NA	83	6.13e+008	6.13e+008	ug/kg
BERYLLIUM	1.10000	0.966	0.057	133	1.33	mg/kg
CHROMIUM	21.30000	16.99	0.058	NA	NA	mg/kg
DIBENZO(a,h)ANTHRACENE	270.00000	NA	50	78400	784	ug/kg
FLUORENE	190.00000	NA	81	8.18e+007	8.18e+007	ug/kg
IRON	18400.00000	18037	1.8	613000	613000	mg/kg
LITHIUM	15.00000	11.55	0.46	40900	40900	mg/kg
NICKEL	17.10000	14.91	0.77	40900	40900	mg/kg
SODIUM	396.00000	91.84	396	NA	NA	mg/kg
ZINC	81.30000	73.76	1.5	613000	613000	mg/kg

Figure 3
Surface Soil Results Greater than Background Mean Plus 2 Standard Deviations or Detection Limits IHSS Group 400-10

KEY

- IHSS
- PAC
- Building
- Paved Area
- Surface Soil Sampling Location

N

20 0 20 40 60 80 100 Feet

Scale = 1:1200

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: Date: August 2002

RADMS

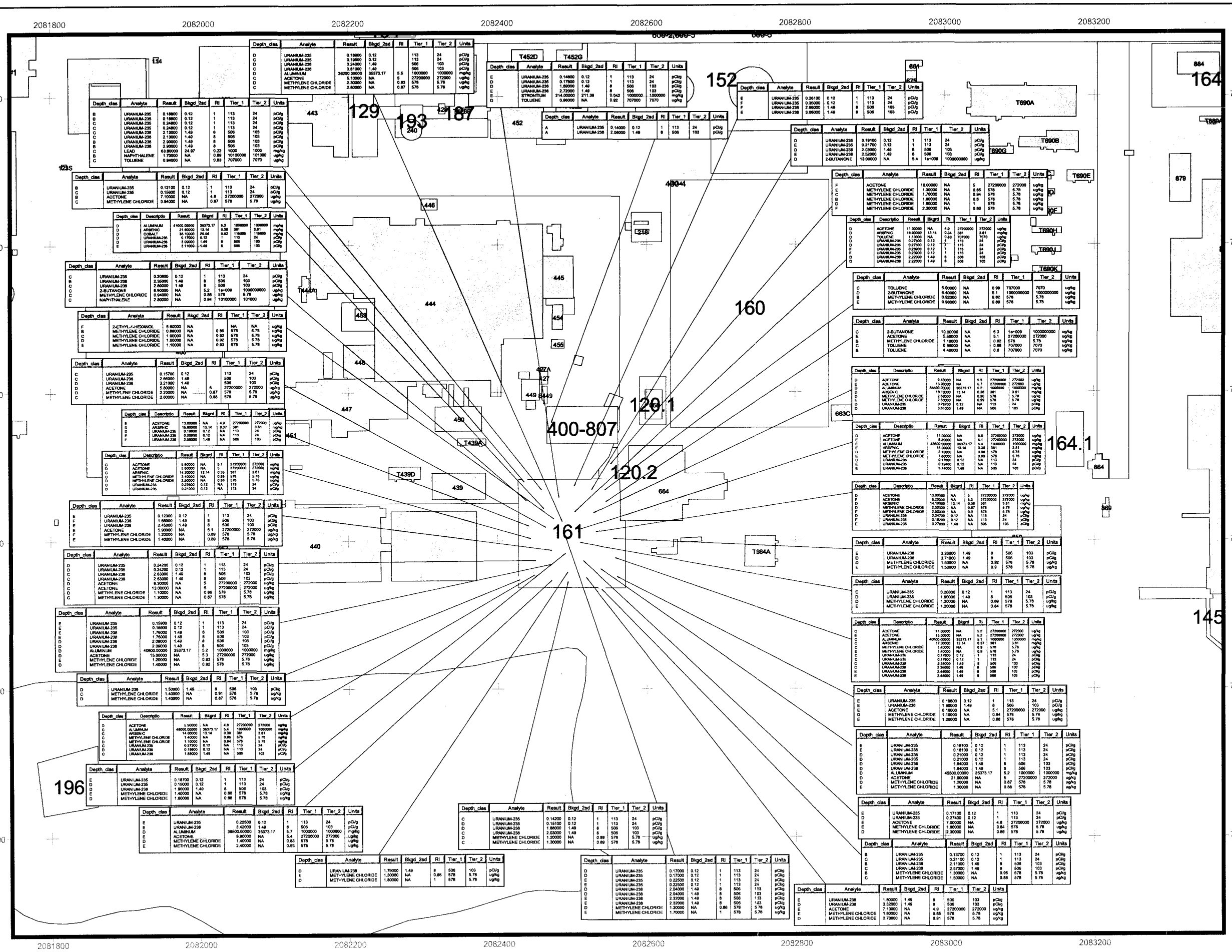
Prepared for:

KAISER•HILL COMPANY

File: w:/projects/fy2002/400-10/Group 400-10sps.apr

9

Figure 4
Subsurface Soil Sampling Results Greater Than Background Mean Plus Two Standard Deviations or Detection Limits IA Group 400-10



KEY

- IHSS
- PAC
- Building
- Streams
- Paved Areas
- Fences
- Subsurface Soil Sampling Location

Scale = 1:2,200

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: Date: August 2002

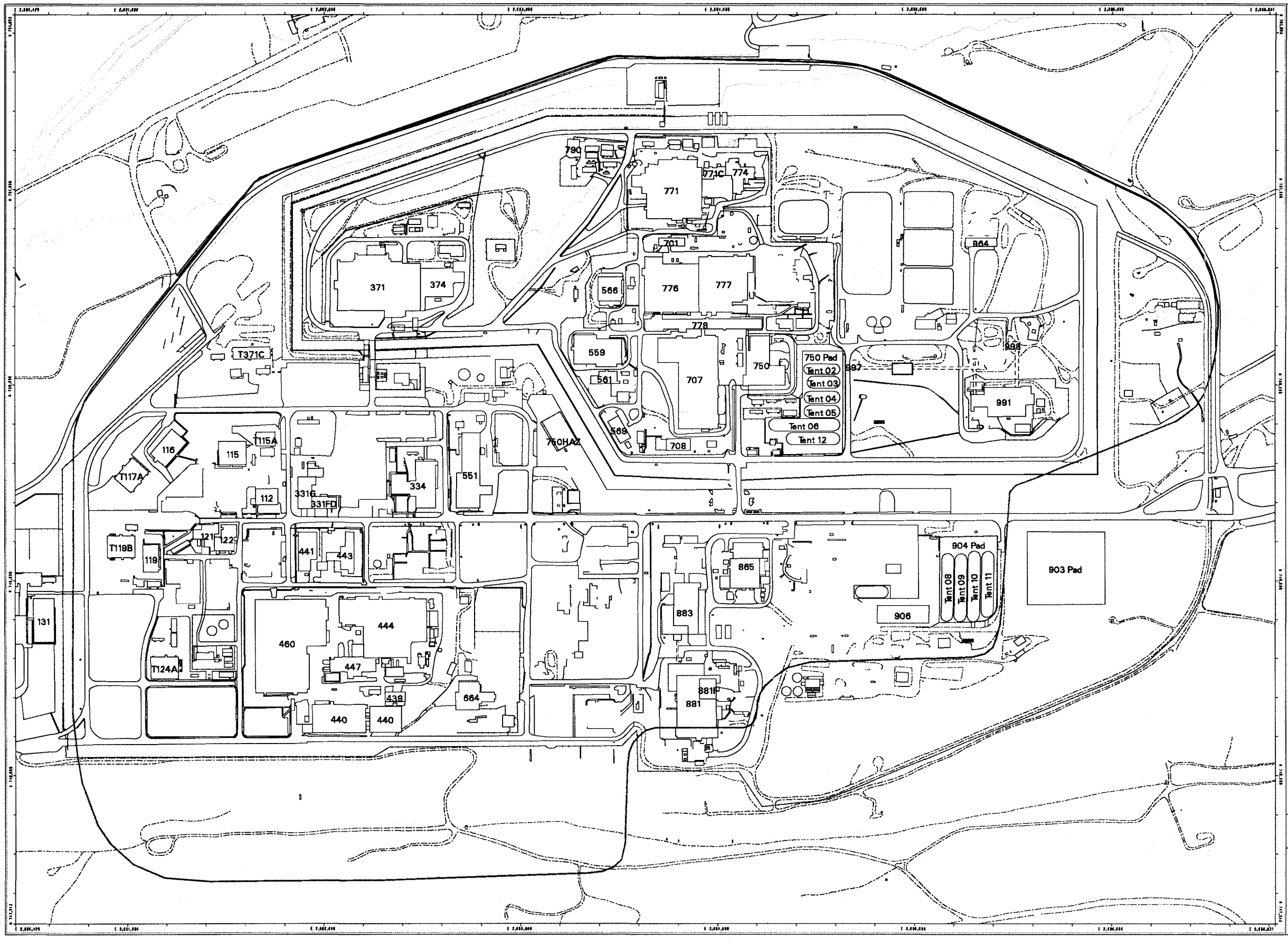
RADMS

Prepared for:

KAISER•HILL COMPANY

File: w:/projects/fy2002/400-10/400-10sps.apr

Figure 1
IA Location Map



EXPLANATION

IHSS Groupings

- IHSS 900-175

Standard Map Features

- Buildings and other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Dirt roads
- Solar Evaporation Ponds (SEPs)
- Industrial Area Operable Unit Boundary

DATA SOURCE BASE FEATURES:
PACs
Historical Release Report (HRR)
2nd Annual Update
Sept. 30, 1997
Individual Hazardous Substance Sites (IHSS)
DOE, 1992, HRR Report and Subsequent Updates.
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs. 1/96

Scale = 1 : 6000
1 inch represents 500 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by: DynCorp — THE ART OF TECHNOLOGY

Prepared for: KAISER-HILL COMPANY

November 15, 2002

NT_Svr w:/projects/er/fy03/ias/900-4-5/data_summary_report/ihss_175.aml

Figure 2
900-175 Surface Soil Results Greater than Background Mean Plus Two Standard Deviations or Reporting/Detection Limits

Location	Analyte	Result	RI	Tier_1	Tier_2	M+2sd	Units
CK43-001	Benzo(a)anthracene	180.00	41.00	614000.00	6140.00	NA	UG/KG
CK43-001	Benzo(a)pyrene	230.00	99.00	61400.00	614.00	NA	UG/KG
CK43-001	Benzo(b)fluoranthene	240.00	110.00	614000.00	6140.00	NA	UG/KG
CK43-001	BENZO(k)FLUORANTHENE	230.00	98.00	6140000.00	61400.00	NA	UG/KG
CK43-001	Bis(2-ethylhexyl)phthalate	75.00	73.00	32000000.00	320000.00	NA	UG/KG
CK43-001	CHROMIUM	40.30	0.35	44300.00	4410.00	17.0	MG/KG
CK43-001	Chrysene	260.00	56.00	61400000.00	614000.00	NA	UG/KG
CK43-001	Copper	28.10	0.18	71100.00	71100.00	18.1	MG/KG
CK43-001	Fluoranthene	550.00	88.00	76800000.00	76800000.00	NA	UG/KG
CK43-001	Indeno(1,2,3-cd)pyrene	150.00	50.00	614000.00	6140.00	NA	UG/KG
CK43-001	Nickel	30.50	0.43	38400.00	38400.00	14.9	MG/KG
CK43-001	Pyrene	470.00	42.00	57600000.00	57600000.00	NA	UG/KG
CK43-001	Zinc	96.90	0.57	576000.00	576000.00	73.8	MG/KG

Location	Analyte	Result	RI	Tier_1	Tier_2	M+2sd	Units
CL43-001	Benzo(a)anthracene	310.00	39.00	614000.00	6140.00	NA	UG/KG
CL43-001	Benzo(a)pyrene	270.00	95.00	61400.00	614.00	NA	UG/KG
CL43-001	Benzo(b)fluoranthene	240.00	100.00	614000.00	6140.00	NA	UG/KG
CL43-001	BENZO(k)FLUORANTHENE	290.00	94.00	6140000.00	61400.00	NA	UG/KG
CL43-001	Bis(2-ethylhexyl)phthalate	100.00	70.00	32000000.00	320000.00	NA	UG/KG
CL43-001	CHROMIUM	114.00	0.35	44300.00	4410.00	17.0	MG/KG
CL43-001	Chrysene	390.00	54.00	61400000.00	614000.00	NA	UG/KG
CL43-001	Copper	36.60	0.18	71100.00	71100.00	18.1	MG/KG
CL43-001	Fluoranthene	690.00	85.00	76800000.00	76800000.00	NA	UG/KG
CL43-001	Indeno(1,2,3-cd)pyrene	150.00	49.00	614000.00	6140.00	NA	UG/KG
CL43-001	Iron	18900.00	1.60	576000.00	576000.00	18000	MG/KG
CL43-001	Lithium	11.60	0.24	38400.00	38400.00	11.6	MG/KG
CL43-001	Nickel	69.70	0.43	38400.00	38400.00	14.9	MG/KG
CL43-001	Pyrene	690.00	40.00	57600000.00	57600000.00	NA	UG/KG
CL43-001	Zinc	80.50	0.58	576000.00	576000.00	73.8	MG/KG

Location	Analyte	Result	RI	Tier_1	Tier_2	M+2sd	Units
CL43-000	Benzo(a)anthracene	44.00	40.00	614000.00	6140.00	NA	UG/KG
CL43-000	Bis(2-ethylhexyl)phthalate	9700.00	140.00	32000000.00	320000.00	NA	UG/KG
CL43-000	CHROMIUM	34.40	0.35	44300.00	4410.00	17.0	MG/KG
CL43-000	Chrysene	58.00	54.00	61400000.00	614000.00	NA	UG/KG
CL43-000	Copper	19.50	0.18	71100.00	71100.00	18.1	MG/KG
CL43-000	Fluoranthene	120.00	86.00	76800000.00	76800000.00	NA	UG/KG
CL43-000	Nickel	20.20	0.43	38400.00	38400.00	14.9	MG/KG
CL43-000	Pyrene	100.00	41.00	57600000.00	57600000.00	NA	UG/KG
CL43-000	Pyrene	100.00	82.00	57600000.00	57600000.00	NA	UG/KG
CL43-000	Zinc	80.60	0.57	576000.00	576000.00	73.8	MG/KG

Location	Analyte	Result	RI	Tier_1	Tier_2	M+2sd	Units
CL43-002	Benzo(a)anthracene	160.00	41.00	614000.00	6140.00	NA	UG/KG
CL43-002	Benzo(a)pyrene	190.00	98.00	61400.00	614.00	NA	UG/KG
CL43-002	Benzo(b)fluoranthene	170.00	100.00	614000.00	6140.00	NA	UG/KG
CL43-002	BENZO(k)FLUORANTHENE	200.00	97.00	6140000.00	61400.00	NA	UG/KG
CL43-002	Bis(2-ethylhexyl)phthalate	1600.00	71.00	32000000.00	320000.00	NA	UG/KG
CL43-002	CHROMIUM	28.20	0.36	44300.00	4410.00	17.0	MG/KG
CL43-002	Chrysene	210.00	55.00	61400000.00	614000.00	NA	UG/KG
CL43-002	Copper	31.50	0.19	71100.00	71100.00	18.1	MG/KG
CL43-002	Fluoranthene	440.00	87.00	76800000.00	76800000.00	NA	UG/KG
CL43-002	Indeno(1,2,3-cd)pyrene	110.00	50.00	614000.00	6140.00	NA	UG/KG
CL43-002	Lithium	11.80	0.25	38400.00	38400.00	11.6	MG/KG
CL43-002	Nickel	23.80	0.45	38400.00	38400.00	14.9	MG/KG
CL43-002	Pyrene	450.00	42.00	57600000.00	57600000.00	NA	UG/KG
CL43-002	Strontium	63.20	0.02	1000000.00	1000000.00	48.9	MG/KG

Location	Analyte	Result	RI	Tier_1	Tier_2	M+2sd	Units
CK43-002	Benzo(a)anthracene	210.00	40.00	614000.00	6140.00	NA	UG/KG
CK43-002	Benzo(a)pyrene	240.00	96.00	61400.00	614.00	NA	UG/KG
CK43-002	Benzo(b)fluoranthene	230.00	100.00	614000.00	6140.00	NA	UG/KG
CK43-002	BENZO(k)FLUORANTHENE	240.00	95.00	6140000.00	61400.00	NA	UG/KG
CK43-002	Bis(2-ethylhexyl)phthalate	310.00	70.00	32000000.00	320000.00	NA	UG/KG
CK43-002	CHROMIUM	102.00	0.36	44300.00	4410.00	17.0	MG/KG
CK43-002	Chrysene	260.00	54.00	61400000.00	614000.00	NA	UG/KG
CK43-002	Copper	74.40	0.18	71100.00	71100.00	18.1	MG/KG
CK43-002	Dibenz(a,h)anthracene	64.00	48.00	61400.00	614.00	NA	UG/KG
CK43-002	Fluoranthene	540.00	85.00	76800000.00	76800000.00	NA	UG/KG
CK43-002	Indeno(1,2,3-cd)pyrene	160.00	49.00	614000.00	6140.00	NA	UG/KG
CK43-002	Nickel	69.30	0.44	38400.00	38400.00	14.9	MG/KG
CK43-002	Pyrene	500.00	41.00	57600000.00	57600000.00	NA	UG/KG
CK43-002	Zinc	172.00	0.58	576000.00	576000.00	73.8	MG/KG

Location	Analyte	Result	RI	Tier_1	Tier_2	M+2sd	Units
CK43-000	Benzo(a)anthracene	100.00	40.00	614000.00	6140.00	NA	UG/KG
CK43-000	Benzo(a)pyrene	140.00	97.00	61400.00	614.00	NA	UG/KG
CK43-000	Benzo(b)fluoranthene	130.00	100.00	614000.00	6140.00	NA	UG/KG
CK43-000	BENZO(k)FLUORANTHENE	150.00	96.00	6140000.00	61400.00	NA	UG/KG
CK43-000	Bis(2-ethylhexyl)phthalate	82.00	71.00	32000000.00	320000.00	NA	UG/KG
CK43-000	CHROMIUM	106.00	0.36	44300.00	4410.00	17.0	MG/KG
CK43-000	Chrysene	150.00	55.00	61400000.00	614000.00	NA	UG/KG
CK43-000	Copper	31.90	0.19	71100.00	71100.00	18.1	MG/KG
CK43-000	Fluoranthene	330.00	87.00	76800000.00	76800000.00	NA	UG/KG
CK43-000	Indeno(1,2,3-cd)pyrene	73.00	49.00	614000.00	6140.00	NA	UG/KG
CK43-000	Nickel	67.90	0.44	38400.00	38400.00	14.9	MG/KG
CK43-000	Pyrene	290.00	41.00	57600000.00	57600000.00	NA	UG/KG
CK43-000	Zinc	171.00	0.59	576000.00	576000.00	73.8	MG/KG

KEY

- Surface Soil Location
- IHSS
- Solar Ponds
- Building
- Original Process Waste Line
- Paved Area
- Dirt Road
- Stream

Bdg_ft = Soil Begin Depth Feet
End_ft = Soil End Depth Feet
RI = Reporting/Detection Limit
M+2sd = Background Mean Plus Two Standard Deviations

40 0 40 80 Feet

Scale = 1: 850

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: RADMS Date: April 2003

Prepared for: KAISER•HILL COMPANY

w:/projects/fy2003/900-4&5/characterization/900-4&5_current.apr

54